Food Manufacture

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Those Bakers.

A GENERAL BOOTH has arisen amongst the bakers. "Let us hope," says he, "that the time will never come when Baking is a simple trade"—and, we may interpolate, when Banking is simply a trade—"when money will be made without effort, and success won easily."

Heartily do we agree with these noble sentiments! There would be no peace of stomach at the mere thought of being at the mercy of those fellows, were they to extract money "without effort" and to rejoice over "success won easily."

But the General comes to the rescue with these words of exhortation: "The finest results always come when man is up against difficulties and problems which tax his ingenuity and test his powers of endurance and fortitude." We agree; and the following is the first dose of correction (made up from the January *Arkady Review*)—to be administered immediately.

The Gluten Mixture.

Crude gluten, obtained by the washing-out process, is a mixture of carbohydrates (chiefly starch), 5 to 20 per cent.; lipoids, 5 to 10 per cent.; ash and fibrous matter in various proportions, and proteins. Mineral matter and lipoids greatly influence those colloidal properties of the proteins which determine the physical condition of the gluten. The protein portion has been resolved into glutenin, gliadin, globulin, albumin, coagulum, proteose, and certain nitrogen compounds soluble in water. For the properties of these proteins, reference should be made to the *Arkady Review*.

The Bakers' Friend.

Recent research has greatly assisted the baker by bringing to light the fact that the behaviour of crude wheat gluten under the influence of acids, alkalis, and salts is the result of complex and mutual action between its various colloid components and electrolytes. This has led to the introduction of methods based upon the principles of colloid chemistry, and, in fact, has altered the whole method of attack on problems of flour-milling and bread-making. It has been found, for instance, that the chief differences between flour, dough, and new and stale breads are mainly physical.

The realisation of the importance of colloids has provoked considerations of viscosity, and out of this has emerged at least one important fact—namely, that flour of poor baking quality invariably gives viscosity figures, for an ungelatinised suspension, considerably below those of good flours of the same grade. Apparently, the best baking "strength" is associated with a medium viscosity of the ungelatinised flour suspension. Luers is of the opinion that gliadin is the protective, and therefore the chief colloid in the protein system, and that variation in its hydration and degree of suspension must largely influence the baking qualities of the flour.

A little more of this probing about, finding out things, and (with apologies to Mr. Whymper)—

> Then one fine day—the finest day—
> Proper understanding came his way;
> The yeast chirped up, the world looked bright,
> And everything went in the bakehouse right.

Back to the Sea.

The image of Aphrodite rising from the sea is not without scientific justification, since the various salts present in the circulating fluids of animals correspond in nature and relative amounts to what is believed was the composition of the ocean some hundred million years ago. It is pretty certain that life originated in the primeval ocean.

The living cell contains a system known as protoplasm. What it is, no one can say exactly. One of the fundamental components of this protoplasm is the class of proteins. Each type of cell in each species of organism contains one or more proteins which are peculiar to it. Other important components are the chlorides, bicarbonates, and phosphates of sodium, potassium, and calcium. Then, in addition, there are those mysterious bodies known as enzymes, which catalyse the various chemical actions occurring within the cell.

And, by the way, the protoplasm exists as a colloid (a rather fluid sort of jelly). There is something very significant in this "jelly" condition of the protoplasm—perhaps the baker will stumble across it in his researches into gluten!

Iodine.

There is one constituent of the sea, and of living matter, which we have omitted to mention, and that is iodine. This element, together with manganese, fluorine, copper, zinc, and some others are found in traces, and were at one time thought to be accidental so far as living matter is concerned. Now, they are believed to perform some important function of life. Iodine, for instance, appears to be essential to growth. It is a most extraordinary thing how the soluble parts of the rocks of the earth, washed into the sea and retained there in solution, should become essential components of the mechanism of life!

We have been led to make these few learned remarks by way of prefacing the announcement that the Department of Agriculture at Ottawa is conducting inquiries in its chemical laboratories to determine the value of fish meal as a source of iodine in the diet of milch cows, and, also, the form in which the iodine occurs in cow's milk. It is very difficult to measure the minute quantities of this substance in such materials as fish meal and milk, but Watson has developed what appears to be a useful and reliable method.

Iodine Estimation.

This is a modification of the Kjeldahl nitrogen process, in which, after digesting the sample in the ordinary way and freeing the iodine by the addition of ferric ammonium sulphate, the amount is determined by titration of the excess thiosulphate solution in the absorption flask. Publication is likely to be made during the current year.

Food from Wood.

We note that the famous Dr. F. Bergius, who startled the world by turning coal into oil, is now appearing as chairman of the Holzhydrolyse A.—G., a company that is setting out to produce carbohydrates for use as feeding stuffs from waste wood. Experiments have indicated that this venture is likely to be commercially successful. Experience has taught us to expect anything in the way of chemical freaks from Germany.

We have not forgotten the freak substitutes for foodstuffs that wartime Germany inflicted upon its unhappy citizens. One of these, masquerading under the grand title of "Kriegsviehfutter," consisted of nothing more than sawdust moistened with salt water. No doubt this would make a high-power thirst-producer, and might find a place as part of the regular equipment of those who administer to the blowers of froth. But it does not appear to be a suitable food for cattle, swine, and poultry.

"Rindermehl" was a flour of dried bark from which the fibre had been separated by a special milling process, and Richardsen showed that it can be fed to dairy cows.

Waentig found that in boiled pine shavings given to horses, 7·5 per cent. of the dry matter and 10·3 per cent. of the crude fibre was digestible. The best sawdust for feeding purposes comes from the beech.

The most satisfactory results, however, were obtained by boiling disintegrated sawdust with dilute acid under pressure, whereby some 20 per cent. of the sawdust is transformed into sugar, while the rest is rendered more digestible. The sugar is extracted with hot water and the excess acid neutralised; then the extract is evaporated to a syrup, which is mixed with the insoluble residue. The following is said by S. T. Dana, of America, to be a good ration for dairy cows: Hydrolised sawdust 25 parts, oats 30 parts, wheat bran 30 parts, semolina flour 15 parts.

Synthetic Jam.

As one's experience of the ways of men and the tricks of chemistry gradually accumulates, the force of the saying that "things are not always what they seem" becomes increasingly evident. We have shown how sugar can be produced from wood, and the thought comes to us that this curious, yet scientific, fact may illuminate one of the dark corners of jam-making and may serve to uproot all the unkind things that have been said in and out of court concerning jam-makers and artificial seeds. May we suggest that the latter were never meant to represent seeds at all, but that they are merely the remnants of wood that have escaped change into sugar? Naturally, the manufacturer who indulged in this highly scientific practice would be very unwilling to give away the true state of affairs and so disclose a valuable secret to his competitors. In any case, why shouldn't wood-gnawing become as popular as gum-chewing?

Anchovy Paste.

The colouring of anchovy paste has been the subject of an investigation by the British Food Manufacturers' Research Association, with the object of finding a natural colouring matter capable of giving satisfactory results. In the past, anchovy paste has generally been coloured with a small proportion of bole armenia, which, as used for this purpose, is a highly purified form of oxide of iron. In this country its use is still permitted, but in some countries its use is prohibited, and, in fact, there are few permissible colouring matters from which a choice can be made, since they are not the most satisfactory from the manufacturer's point of view.

A method of using one of the dyestuffs, permitted in most countries, was found which gives reasonably good results. This has not yet been tried out on the large scale to a sufficient extent to prove its value to the trade.

The Spirit of Bread.

Man is not content with his distilleries and breweries; a few years ago he found a way of making alcohol out of the coke from gas-works and the gases belched out of the mouths of blast-furnaces, and also out of the dust of saw-mills—as we have already remarked. This craze has evidently extended to the bakehouse, for, the other day, we came across a patent describing how alcohol may be recovered from the vapours of bakehouse ovens. Instead of allowing these exhilarating efflorescences to wander freely about the baker's premises—a source of danger to all self-respecting workmen—it is suggested they be passed through a cooling coil arranged to condense alcohol and water separately. The inventor states that the water is returned to the oven, but, unfortunately, does not give instructions as to what shall be done with the alcohol. Why has no one thought of this before?

Vision.

We were very pleased to learn that Mr. F. C. Gephart, of New York, who very kindly sent us reprints of his excellent papers on the chemistry and manufacture of cocoa and chocolate, concurs with one of our pet views that both machinery and methods used in one industry may be advantageously used in another industry. He points out that "an understanding of the fundamental principles involved and a keen insight into individual needs and problems in a great variety of industries, permits one so informed to make such adaptations advantageously." It is probably true to say that herein lies one of the main points of difference between the American and the English outlook. The Britisher is inclined to "stick to his last" and to narrow down his knowledge to that of one particular branch of industry; the American is not averse to wandering from one to another, thereby broadening his experience and cultivating a more elastic and receptive attitude of mind, and incidentally bringing about an active interchange of ideas, which is an advantage to those industries that for one reason or another have lagged behind the main advance. He realises, in fact, that, as in science, there are no watertight compartments in industry as a whole; materials may vary, but the fundamentals of factory processing have much in common. This has always been one of our "planks" as a technical journal.

Chocolate Control.

Again, with reference to the subject of scientific control—a matter which we have constantly stressed—Mr. Gephart writes, in his paper on the "Manufacture and Composition of Chocolate Products": "It would be a simple matter to cite numerous instances in a variety of products where great financial damage has resulted from lack of control in their manufacture, buyer-seller disputes resulting in rebates and penalties and often in loss of contracts. It is possible, at a nominal cost, to standardise the manufacture of these products in a sound, scientific, and business-like manner." "When chemistry is applied industrially in virgin fields, a business organisation in which this application is made takes on a new lease on life." "*Chemistry, however, is only a tool with which to work. Its successful use requires skilful application, coupled with a broad understanding of the problems at hand and their comparative scale of importance.*"

It is this last quotation that we would especially mark as being of the utmost importance to British industrialists and chemists—perhaps the latter more than the former. Largely owing to what may be termed "educational inertia," the chemist of this country is reared on "pure" science, with the result that a statement to the effect that his chemistry is "only a tool" would ordinarily be taken as insulting language. Fortunately for all concerned, this attitude is tending to become modified under the stress of stern reality.

Casein Uses.

The use of casein in industry is unique, in that an excellent food is used for an extraordinary variety of industrial purposes. Dr. W. L. Davies, of the National Institute for Research in Dairying, draws attention to the fact that its colloidal nature (the ubiquity of this colloid business is positively disconcerting!), plasticity, and adhesive properties give it an important place—a place which no other substance can fill.

Some of the manifold uses of casein are: in adhesives, such as glues, putties, and cements; for sizing, etc., in the paper industry; for the preparation of

artificial stone, ivory, and other "plastics"; for mordants, sizes, etc., in the textile industry; in paints, such as calcimines and varnishes; in foods, such as baking-powder and proprietary foods; in medicine; for miscellaneous purposes, such as sprays, shoe polishes, creams, and pastes.

It is hard to believe that knife handles, buttons, shoe polishes, and cements can be derived from milk, and it is equally difficult to say whether the cow would be pleased or otherwise if she realised the true extent of her ramifications.

Canned Peas.

Those interested in the canning of peas and corn will find valuable material in Bulletin No. 25—L., dealing with thermophilic contamination in the canning of peas and corn, and issued by the National Canners' Association Research Laboratory, Washington, D.C. Spoilage is usually caused by thermophilic or "heat loving" bacteria, and it would appear that such spoilage results from the accumulation of spores of these bacteria in one or more units of the factory equipment, probably where heat is used.

Butter Fat.

In connection with the routine examination of butter in the laboratory of the Butter-Testing Station, Harcourt Terrace, Dublin, it was noticed that oil separated from butter fat when kept under certain conditions. Paul Arup has examined this phenomenon with a view to developing methods of analytical control, and has recorded the results in a paper entitled "The Composition of Irish Butter" (*The Analyst*, December, 1928).

Grass Briquets.

A Norwegian chemist, in collaboration with the Department of Agriculture of the University of Cambridge, has devised a process by which completely dry grass in the form of briquets can be made having the same qualities and the same nutritive value as fresh grass. When being fed to cattle, the briquets are dissolved—so it is stated—in a little water. Grass briquets have been distributed among British farmers for testing and the reports are said to be very favourable. One advantage of the invention is that the grass can be harvested and conserved in the most favourable stage of growth. Patent licences have already been sold to several European countries.

Mayonnaise Oils.

David Wesson, of the Southern Cotton Oil Company, gives a few words of advice on oils for mayonnaise. In his opinion, cottonseed oil will for many years to come be the chief source of supply—on account of its abundance and good flavour. Corn oil is valuable to the mayonnaise maker in cold weather, but does not keep its flavour. Peanut oil is especially suitable if properly winterised; to give the best results it should be deodorised. The same is true of sesame oil. In selecting an oil for mayonnaise, it is very desirable to look for the lowest possible free acid content. It has been found that free fatty acids act as a catalyser and start the formation of bodies which give rancidity reaction with the Kries test. Oils can be turned out low in fatty acids and such oils only should be used.

A standard mayonnaise containing 70 per cent. oil and 8 per cent. egg yolk has a calorific value of 3,000 calories per pound, which shows that this has a greater food value (in one sense) than many of our common articles of diet.

Black Vinegar.

The blackening of vinegar is usually due to the presence of iron salts in association with tannin. The iron is derived from contact with iron pipes, etc., or adventitious bodies. To make the vinegar palatable as well as marketable, the iron must be removed by the addition of tannin; the tank should be blown or aerated to hasten the oxidation and formation of iron-tannate and then be allowed to settle.

Another clarifying agent used is the highest quality isinglass; a stock solution contains 1 lb. isinglass, 3 lbs. distilled vinegar (100 grains), and sufficient water to make 100 lbs. 1⅞ lbs. stock solution is sufficient for a 47-gallon barrel of vinegar. The colder the vinegar, the quicker and better the precipitation, with less likelihood of further clouding.

The addition of tannin and good gelatine together also gives good results.

Mayonnaise.

The U.S. Secretary of Agriculture has adopted the following definition and standard for mayonnaise salad dressing:

"Mayonnaise, mayonnaise dressing, mayonnaise salad dressing, is the clean, sound, semi-solid emulsion of edible vegetable oil and egg yolk or whole egg, with vinegar and/or lemon juice, and with one or more of the following: salt, spice, sugar. The finished product contains not less than 50 per cent. of edible vegetable oil, and the sum of the percentages of oil and egg yolk is not less than 78."

Eggs!

We take off our hats to the Daily Press.

But—surely our politicians are not beginning to "show the white feather"? Does it mean that they are afraid to "face the music"?

Quality and Value in Cheese

By L. J. LORD

When the Romans invaded Britain in 54 B.C., *they found a hardy race, unconquerable save by superior arms and tactics and strategy unknown to them. The secret of Britain's endurance was discovered by Cæsar to be their chief diet—Cheese. (See "Gallic War," Book I.)*

PART I

A Cheshire Cheese Fair.
(By courtesy of the Cheshire Cheese Federation.)

THE AIM of the judge at the Cheese Show, and equally that of the buyer at the Cheese Fair, or market, is a full consideration of the quality of the cheese before him. "Quality" and "market value" are synonymous terms only in relation to cheeses that are strictly of the same type or, rather, variety, for whereas, in relation to cheese, the word "type" is applied to goods that are the same in appearance, shape, and solidity, the word "variety" indicates any cheese enjoying the same specific name and appealing to the same local community as representative of their produce.

The official grading of cheese is now carried out at several sources of supply, the system having, in most cases, been instituted for the purpose of building up an export trade.

The grading will usually be carried out upon examination alone, when a certain percentage of marks may be allotted to perfection in particular qualities, but in some cases this judgment may be governed by the result of test analyses by a chemist.

For instance, New Zealand examines and grades into three degrees upon total percentage points, as follows:

"Finest" grade, must attain 93 points and upwards.
"First" grade, must attain 90 to 93 points.
"Second" grade, must attain 80 to 90 points.

The Canadian market speaks of first, second, and third grades without any official terms outside those of the numerical grading.

Finland and Holland have an analysis test, indicating that export cheese must reach a certain standard of fat contents, expressed as a percentage of the dry matter (or total solids).

Finland (for classification as whole-milk cheese).—Emmentaler (Gruyère type), not less than 45 per cent. fat; Edam (Dutch type), not less than 40 per cent. fat.

Holland (percentage is branded on the cheese).—Edam and Gouda varieties, classed as "full-cream" cheese, must contain not less than 45 per cent. fat, whereas lower grades are branded 40, 30, and 20 per cent. fat contents.

The official grading of home-manufactured cheese is carried on by two farmers' associations in England. The importance of this movement is evident when it can be said that they are aided by substantial Government grants towards their expenses.

The home manufacture is suffering from foreign competition, and the aim of the associations is, of course, to obtain a better price for their produce, to be attained by such means as providing a better and more uniform quality, and in stimulating demand by advertising.

We have the English Cheddar Cheesemakers' Federation, whose graders judge cheese on the following scale:

Flavour	50 points
Texture and keeping quality ...	30 ,,
Colour	10 ,,
Finish	10 ,,

The "Cheddaration" trade mark, indicating that the cheese in question has passed examination, is stamped upon all cheeses attaining a total of 88 marks out of the possible 100. Only the grader uses the brand, and there is only one grade recognised. The grading officials employed are practical cheesemakers qualified to advise upon any defect or inferiority in the cheese examined.

Then there is the Cheshire Cheese Federation, operating in five of the Western counties, and claiming that more than half the total cheese manufactured in England is of the Cheshire variety.

Grading points are as follows:

Flavour	40
Texture	20
Body and keeping qualities ...	20
Colour	10
Finish	10

The trade mark may be branded on cheeses attaining a total of 92 points, and adjudged to contain 46 to 50 per cent. of fat in the dry matter—*i.e.*, the total solids. Cheeses may not be inspected and approved by the official grader till 18 days old. The early ripening variety of Cheshire cheese will by then be approaching saleable condition.

This association appoints a subcommittee to study the market and advise makers every week of the range of prices at that moment governing the market.

While the output of early ripening cheese is a great feature of the Cheshire markets, everything is being done to encourage the making of the long-keeping variety of this type of cheese, with the result that lost trade is being recaptured in the London and South-Eastern markets.

The Basis of Quality in Cheese

The foundation for these systems of grading lies in the composition of the cheese and the effect that the period of storage and ripening has had upon its consistency and quality as a more or less mature product.

Naturally, one does not look for the same indications of quality in cheeses of a different type, quite apart from the fact that they may possibly be made from milks of different character, or produced under widely different conditions. These are evident in the physical character of the product, but difficult to index from any other point of view.

One is tempted to record a series of comparative analyses of the different varieties of cheese upon the market, but a little examination of such figures soon convinces one that they cannot be taken as indicative of the comparative composition of cheese classed under certain names.

The variation in "richness"—which depends very considerably upon the fat content—of cheeses of the same variety or type taken from the open market, is often extreme. It is, however, an indication of the lack of uniformity in manufacture among the many different makers, not just a matter of chance.

As an instance of this, see the following figures from Cribb's* contribution to the *Analyst* in relation to chemical examination of Dutch cheeses:

Variety.	*No. of Analyses.*		*Percentage Figures.*			
			Water.	*Fat.*	*Proteins.*	*Total Ash.*
Edam ...	4	Average	51·66	11·85	26·82	6·04
		Maximum	60·38	24·40	31·02	7·33
		Minimum	41·70	3·83	24·00	5·54
Gouda ...	11	Average	54·79	9·02	25·94	5·52
		Maximum	60·17	18·37	34 22	7·30
		Minimum	50·46	1·64	22·05	4·26

Of course, the above figures do not represent true averages. No one line adds up to 100. The way in which they are extracted from several results to indicate the range of variation in each item does not admit of using them as representative of the composition of a single cheese. All that we can gather from them is that Edam cheese as a variety has probably less water and more fat than Gouda cheese, and is therefore more often the better class of cheese, but obviously some of the output of both varieties must rank as "skim" cheese.

No one would be justified in putting forward any of these figures against the analysis figures of any other particular variety to imply a general superiority of one or the other in "richness."

Here follows Lloyd's decision as to the comparative composition of Cheddar cheese,* averaged from the results of investigations over the work of seven consecutive cheesemaking seasons, each year the cheese being made from the milk produced upon a different farm in the county of Somerset:

Variety	*No. of Analyses.*	*Water.*	*Total Dry Matter.*			
			Fat.	*Casein, etc.*	*Mineral Matter.*	*Total Solids.*
Cheddar	175	35·58	31·33	29·12	3·97	64·42

These figures may safely be taken as the true average of 175 analyses.

Again, here are Voelcker's figures for samples of Stilton cheese:†

Variety.	*No. Analyses.*	*Water.*	*Total Dry Matter.*				*Salt in the Ash.*
			Fat.	*Casein, etc.*	*Sugar.*	*Total. Ash.*	
Stilton ...	2	32·18 20·27	37·36 43·98	24·31 33·55	2·22 —	3·93 2·20	0·89 0·29

These figures indicate very plainly that both cheeses were made from rich milk, the first quite new at the time of analysis, and the second mature, having lost a great deal of moisture in shrinkage and, consequently, showing a very high percentage fat content.

We must note that the fat in Cheddar cheese given as 31·33 per cent. of the total cheese, is equal to 49·4 per cent. of the "dry matter" or total solids in the cheese; and in the Stilton cheese figures the equivalent for both 37·36 and 43·98, given as the percentages of fat in the total, is no less than 55 per cent. of the total solids, as see:

Cheddar.	*Stilton, No. 1.*	*Stilton, No. 2.*
$\frac{31·33 \times 100}{63·42} = 49·4\%$	$\frac{37·36 \times 100}{67·82} = 55\%$	$\frac{43·98 \times 100}{79·73} = 55\%$

* Cribb, Cecil H., "Notes on Dutch Cheese," in the *Analyst*, Vol. xxxi., pp. 105-111.

* F. J. Lloyd, "Report, etc., on Cheddar Cheesemaking." H.M. Stationery Office.

† Augustus Voelcker, various *Journals* of the Royal Agricultural Society of England.

(*Continued on page* 69.)

Electrical Power in the Manufacture of Beet Sugar

AT LEAST a dozen factories of major importance are now in operation in this country for the production of sugar from home-grown beet, and as, roughly speaking, the relation between daily capacity in tons and horse-power of driving plant is two horse-power per ton, the demand for electrical equipment is considerable, since sugar producing plant can only be operated economically with electric motor drive.

The Site

Sugar beet is grown successfully in various parts of Great Britain, but the largest areas under cultivation are in the East and Midlands of England, with a tendency to spread in a south-westerly direction. The bulk of the beet sugar factories, therefore, are situated in these districts, as it is important that the cost of transport of the beet to the factories be kept as low as possible. Many other considerations, however, demand attention in connection with the choice of factory sites; for example, abundance of river water is necessary, and it must be possible to discharge the effluent to river or sea without the handicap of heavy standing charges incurred in the construction of long pipe-lines or sewers. In addition to good rail and road facilities, approach by water is desirable, as both coal and limestone, as well as beet, are required in quantity, and, of course, labour of the right kind must be available.

Power

It would seem that these factories would provide a most desirable load for a rural electrification scheme, but the demand for electrical power, how-

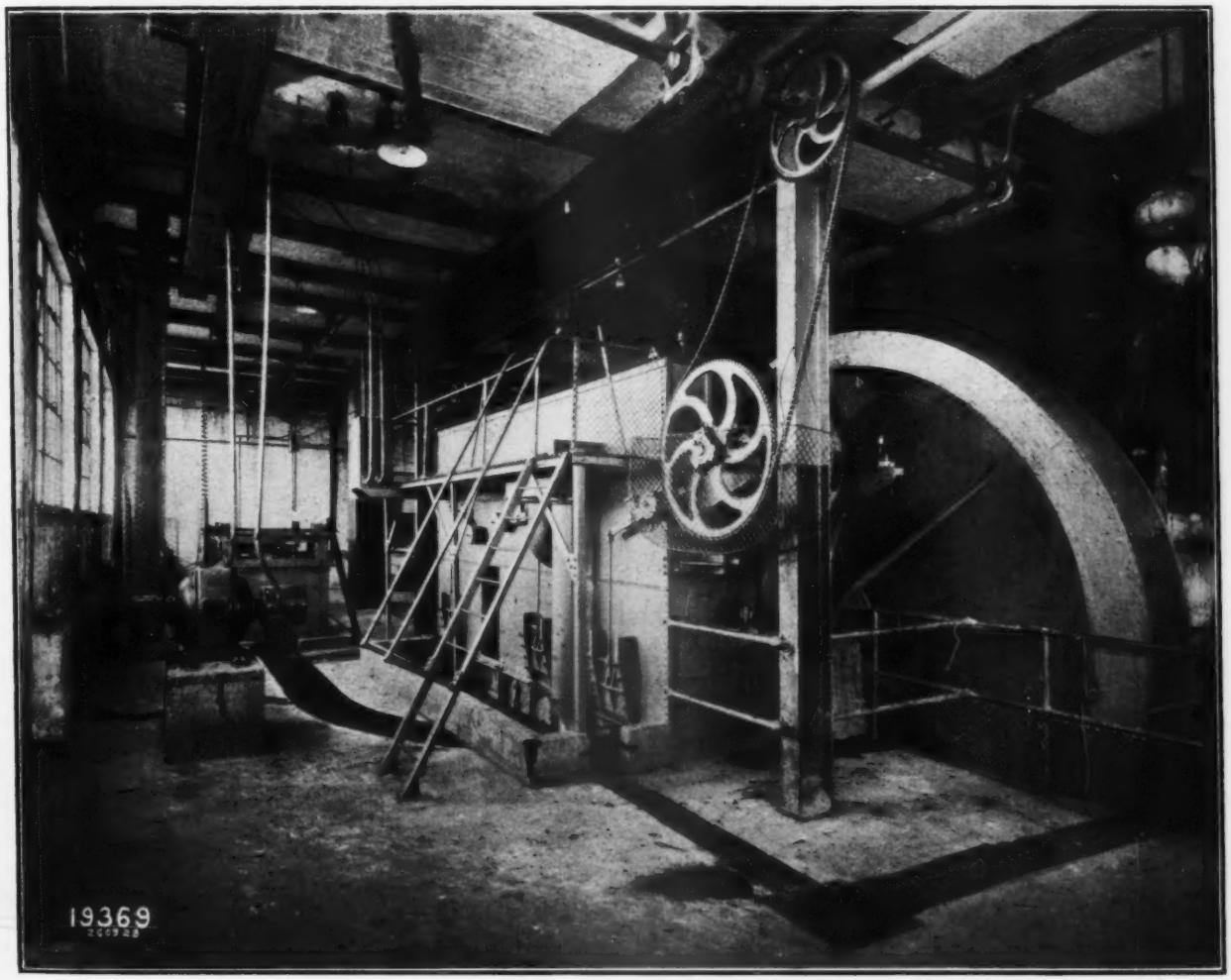

FIG. 1.—Trash Catcher, Beet Elevator Wheel, and Beet Washer driven by Motor of 25 H.P.

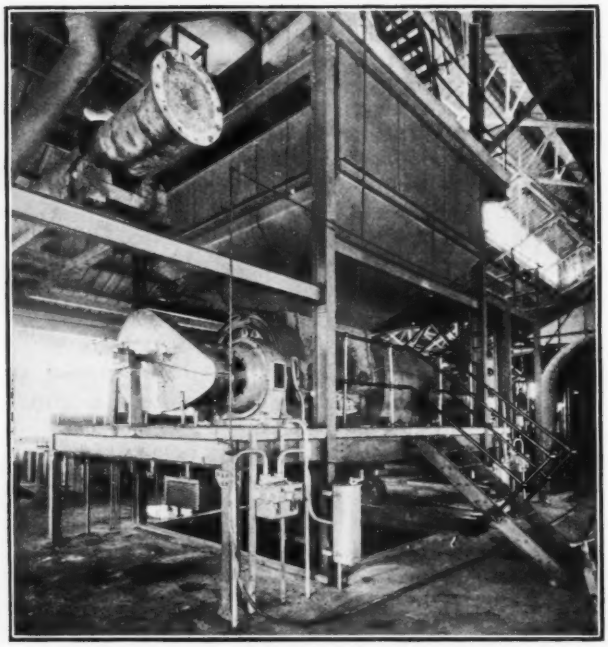

FIG. 2.—Beet Slicers driven through Hans Renold Chain by Motors of 40 H.P.

ever, may be seasonal, although this demand is continuous during day and night so long as there is a supply of beet in store to draw upon. Moreover, much process steam is necessary, so that, although the lighting load and some of the power load can profitably be met from public supply lines, it may be more economical to derive most of the electrical power required from steam-driven generators, the engines, if of the high-speed reciprocating type, being run non-condensing and the exhaust steam used for process work, any excess required being drawn direct from the boiler plant. Alternatively, the generators may be driven by turbines, from which the steam is bled for the process work.

Modern Factories

Beet sugar factories, which are probably the most up-to-date in the country, were recently visited, and it is interesting to deal briefly with some of the characteristics of each. These factories are situated at Selby, on the river Ouse, Bardney, on the Witham, and Brigg, on the Ancholm, and are owned by the Yorkshire Sugar Co., Ltd., the Lincolnshire Beet Sugar Co., Ltd., and the Second Lincolnshire Beet Sugar Co., Ltd., respectively, the capacity of the Selby and Brigg factories being 800 tons daily

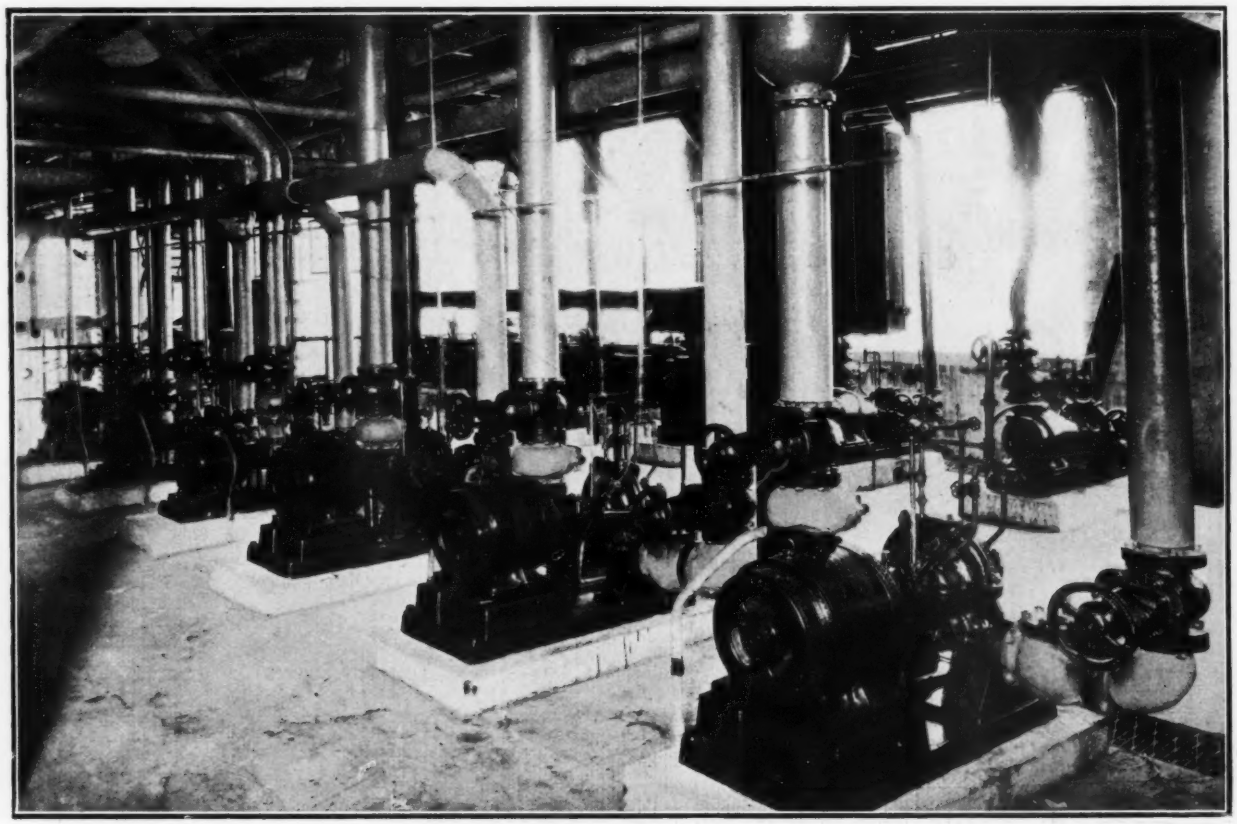

FIG. 3.—Juice-Pumps driven by Motors of 15 and 7½ H.P.

and of the Bardney factory 1,000 tons. The complete factories were designed by the Dyer Company, of 50, Pall Mall, London, the whole of the work being carried out under that company's supervision. With very few exceptions all the electric motors and motor-starters were manufactured by the British Thomson-Houston Co., Ltd., Rugby, and, as will appear from the ensuing notes, a large proportion of the motors are engaged in driving water- and juice-pumps. The electrical supply to the motors is at 400 volts, 50 cycles, three-phase in all cases.

Factory Operations

Ordinarily, most of the beet is delivered direct to the factories in railway trucks, from which it is unloaded by hand to the beet store underneath the sidings, or to a slightly inclined flume leading to the trash catcher, beet elevator wheel, and beet washer, of which an illustration is given in Fig. 1. In this installation, which is at the Selby factory, the driving motor is of 25 h.p. and the motor-starter is conveniently mounted on the platform at the top of the beet washer. It will be noted that the motor is of the induction type with wound rotor, and it may be mentioned here that B.T.H. induction motors, either of the squirrel-cage or slip-ring (wound rotor) type, are well adapted for driving all beet sugar machinery.

From the washer the beets are conveyed to the picking table for examination and removal of any foreign matter which may have passed the trash catcher and washer, and thus, after being automatically weighed, they reach the slicers, the complete conveying plant being operated as a unit by means of an electric motor. Fig. 2 shows the slicers at the Selby factory, each being driven by a 40 h.p. slip-ring motor provided with starting equipment which gives gradual acceleration up to full speed, as slicers are machines for which such starting arrangements are desirable. It will be seen that chain drive is adopted.

The next process is the extraction of the sugar in the beets by means of the diffusion process. The plant for this is the diffusion battery, which, although occupying considerable space, does not directly require electrical power. The raw beet juice obtained is purified by means of lime and carbon-dioxide gas, this process being that of carbonation. After the addition of a small amount of slaked lime, the carbon-dioxide gas is pumped into the raw juice, and precipitates all albuminous and nitrogenous matter as well as the insoluble calcium salts. The juice is then filtered, removing the precipitate, evaporated to a thick liquor and bleached at the sulphur station, refiltered, concentrated, and grained in vacuum pans, the molasses driven off in motor-driven centrifuges, subjected to a final drying operation, and then bagged after being automatically weighed. A view of some Worthington-Simpson juice-pumps driven by squirrel-cage motors of 15 h.p. and 7½ h.p. is given in Fig. 3, and this illustration, in conjunction with Figs. 1, 2, and Fig. 4, which shows melter-pumps driven by 5 h.p. squirrel-cage motors, gives an impression of the interior of a modern beet sugar factory.

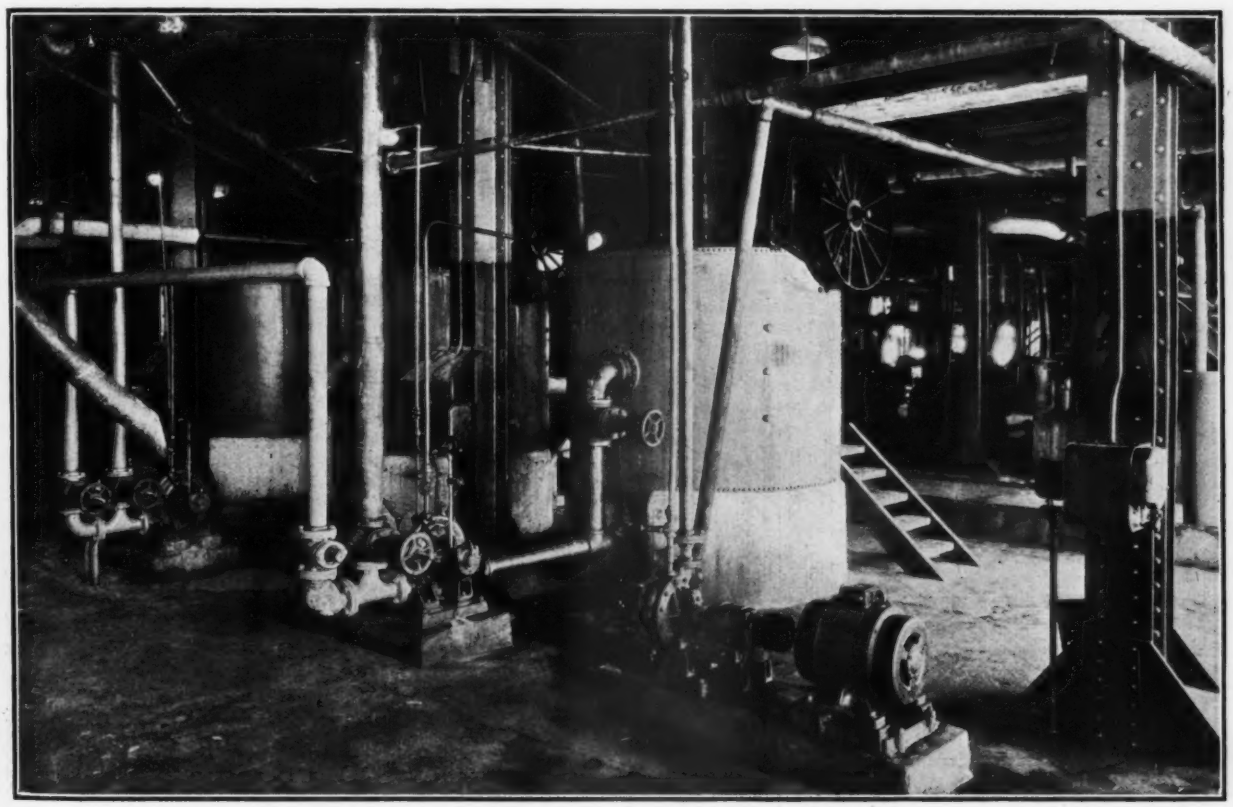

FIG. 4.—Melter-Pumps driven by Motors of 5 H.P

By-Products

No less interesting than the processes for the manufacture of sugar are those for the conversion of the by-products into such commercially valuable substances as cattle food, power alcohol, and fertilisers. The factories visited all make cattle food, for which there is a ready market locally, and in the production of this food both the pulp obtained from the pulp presses and the resultant molasses is used. The molasses is added to the pulp, which contains a large quantity of water (about 93 per cent.), and the mixture is pressed and dried until the water content is reduced to about 10 to 12 per cent. Drying of the pulp is effected at the Bardney and Brigg factories by conveying it through long horizontal tubular chambers, which are slowly rotated by means of electric motors, the pulp in its passage from end to end being dried by the heat from flue gases which are passed through the chambers. This installation is a complete unit, even to the fire grates. A view of a pulp-drier at the Bardney factory is given in Fig. 5, the electric motor being on the right. This motor is rated at 60 h.p., and drives by means of belts and counter shafting (not in position when the photograph was taken). The pulp-drying plant at the Selby factory is different in that it utilises the waste heat in the flue gases from the main steam range, and is in four sections, each rotated by a 30 h.p. slip-ring motor driving through Hans Renold chain and spur-wheel gearing, as shown in Fig. 6. Cyclone-induced draught fans, driven by 45 h.p. squirrel-cage motors are installed to draw the flue gases through the pulp. A view of the motors driving these fans is given in Fig. 7.

Instead of using molasses for cattle food it is possible to render it suitable for human consumption by treatment in a barium plant, in which case the mother liquor is used with super-phosphates, peat, etc., to form a fertiliser. Alternatively, the molasses may be used for the production of power alcohol.

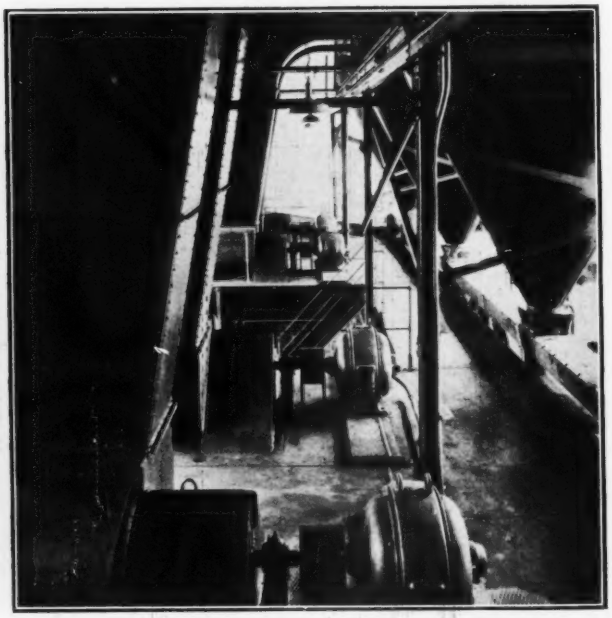

FIG. 7.—B.T.H. Motors of 45 H.P. driving Induced Draught Fans in Drying Plant at the Selby Factory.

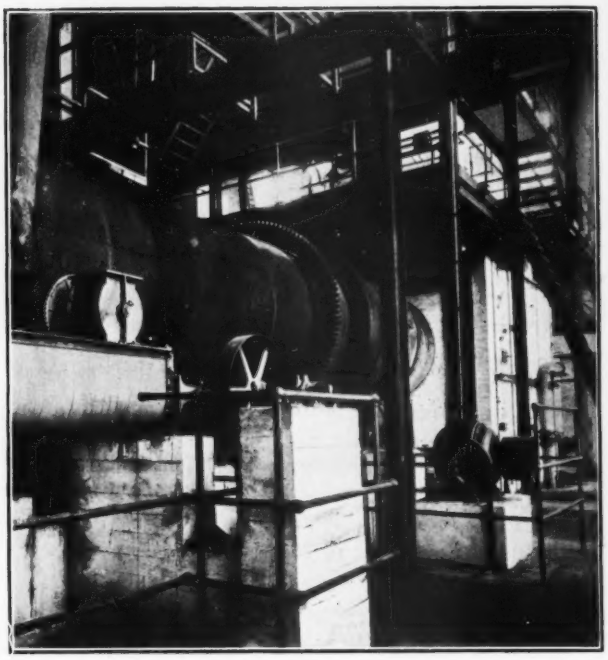

FIG. 5.—View of Pulp Drying Plant at the Bardney Factory.

The motor on the right is of 60 h.p. and drives the equipment through belts and counter-shafting, not seen in the photograph.

The precipitated albuminous and nitrogenous matter, and calcium salts, chiefly calcium carbonate, obtained in the previously mentioned carbonation process also may be used in the preparation of a fertiliser.

Conclusion

In conclusion, reference may be made to one or two special features which strike the eye of a visitor arriving at the factories mentioned. Thus, at the Selby factory there is the hydraulic unloading plant, comprising pumping plant and a movable system of piping which, with a minimum of labour, can be adjusted to wash the beets from the railway trucks direct to the flume leading to the beet wheel in the factory. At the Brigg factory there is an interesting scheme for discharging the effluent to the Humber by means of a long pipe-line and culvert in order to meet special local conditions, which also have been responsible for various interesting details of construction in the Bardney plant. Here, too, is an electrically-operated transporter for the direct delivery to the factory of beet from a large local grower on the opposite side of the river, to the bank of which the beet is despatched by means of a light railway.

The main pumping plants for service water are generally similar, and Fig. 8 shows a pumping station at the Bardney factory, comprising two pumps, each driven by a 160 h.p. squirrel-cage motor, and two, each driven by a similar motor of 50 h.p.

The Rôle of Pure and Applied Science in Industry

By B. CALLOW

There is not infrequently an antipathy between the "practical" man and the scientist. This should not exist. Co-operation between the research worker and the industrialist benefits both. Pure science is absolutely essential for the development of Industry, and the unsolved problems of the industrial world are extraordinarily stimulating to the scientist.

THE TWENTIETH century has witnessed a great change in the relations existing between Science and Industry. In the nineteenth century, most industries distrusted or completely ignored the results obtained by scientists, and the practical man was too often, as Disraeli said, a man who practised the errors of his forefathers. *Mais nous avons changé tout cela.* Nearly all large firms nowadays have a scientific staff, many even employing research workers. The war undoubtedly showed the enormous value of scientific work to many industries, and thus helped to accelerate the movement, and the possession of a research laboratory by a factory no longer calls for comment.

Industrialists certainly appreciate scientists whose work is directly connected with industry, but do they appreciate those whose domain is pure research? What do they think of those benign, absent-minded, childlike professors who, every now and then, startle the scientific world with some amazing discovery? The importance of professors as teachers is realised, for without teachers the supply of works chemists, etc., would soon fail. Does the manufacturer, however, realise the tremendous value of purely "academic" research, which is not undertaken with any practical end in view? The "academic" research worker's main interest is the solution of some more or less abstruse problem. He has no thought for personal gain, nor any idea of possible applications to industry. Since he takes no thought of industry, it may well be asked why industry should concern itself with him. As a matter of fact, industry cannot afford to neglect "academic" work for the simple reason that the applied science which is vital for the progress of industry is based on the results of pure research.

The Scientific Method

The scientific spirit is essentially one of inquiry. The scientific method has none of the magical properties possessed by the Philosopher's Stone of the alchemist; it is a rigid method of inquiry into causes and effects, complicated phenomena are analysed, and the various factors concerned are investigated. Experiments are set up to find the results due to each separate factor. Theories are used but used with caution, tested in every possible way, and discarded if they cease to harmonise with known facts. The scientific method is an attempt to obtain generalisations from particular observations. By this method we obtain some idea of the inter-relationship of events amid the apparent maelstrom of existence. Early scientists were concerned with observation rather than with experimentation. They observed, for instance, that the North Pole star always appears in the same position in the sky, that the sap of trees rises in spring, etc. It was not, however, until Man began to observe the effect of his conscious actions on his surroundings that the beginnings of modern science can be said to have begun. The next stage was the development of the experi-

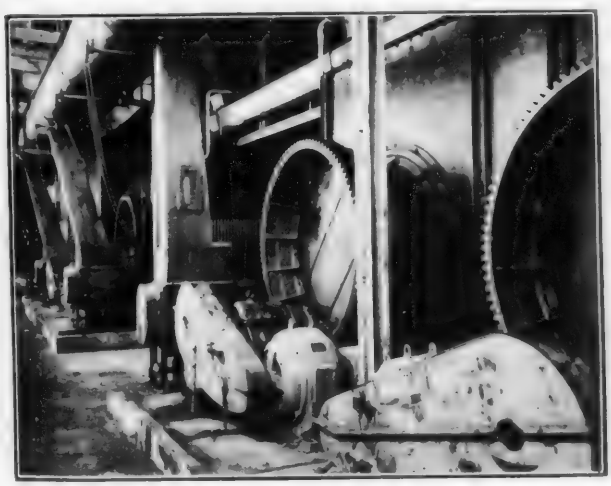

FIG. 6.—Pulp Drying Plant at the Selby Factory. Each of the motors seen is of 30 h.p.

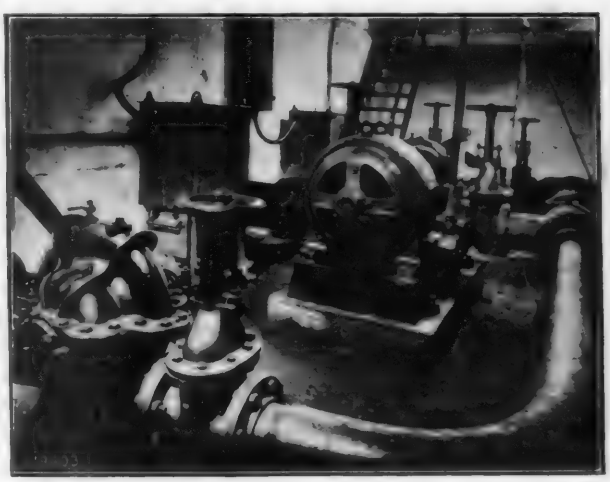

FIG. 8.—A Main Pumping Station with Four Motors, Two of 160 H.P. and Two of 50 H.P.

mental method, the essence of which is the observation of events which are controlled by the experimenter.

Academic Research

Now consider for a moment what the scientific method has done for industry. The routine laboratory is too well known to need detailed description. In it, all kinds of materials are analysed or tested to see whether they fulfil certain conditions. Thus, chemicals are tested for impurities, foodstuffs for preservatives, packing materials for strength, etc. Processes are supervised by the laboratory staff, and tests are carried out on materials at all stages of their manufacture. The works scientist may also be responsible for devising new methods. Research laboratories in factories have a wide range of activities, and the discoveries made are often of great importance. Unfortunately the urgency of the problems confronting the industrial research worker, and the necessity for immediate results, sometimes prevent the problems from being tackled with the thoroughness which they deserve. The idea governing this type of work is too often that the end justifies the means. Still, good work is frequently achieved, as, for example, the improving of flour by heat, which has recently been reported in this journal. Here we must include both the scientist whose work is essentially "academic," but who is stimulated by the problems confronting industry, and also the entirely "academic" worker who hardly realises that industry exists. As examples of the former class selected at random we may mention such names as Papin and Pasteur, placing in the latter class Volta, Oersted, Srensen, and Willard Gibbs.

Papin and Pasteur

Papin was a physicist who lived in the seventeenth century. During the course of his researches he discovered that liquids can be made to boil at higher temperatures than usual if the pressure is increased. The apparatus he used for cooking meat under pressure was known as the Papin Digestor. In reality it was the first autoclave. Papin showed that meat cooked in his digestor was remarkably tender and that even bones could be made gelatinous and edible.

Pasteur's scientific career began with pure research. He was attracted by the problem of the double tartrates. There were known to be two sodium-ammonium tartrates which had the same chemical composition and apparently the same crystal structure; yet when dissolved in water, one rotated the plane of polarised light to the right (dextro-rotation), whilst the other had no effect on light that had been polarised. What caused this difference? Even the famous Mitscherlich had not been able to answer this question. Pasteur made an exhaustive study of the crystalline forms of tartaric acid and the tartrates. To his great joy he observed that the crystals possessed very minute facets which had previously escaped notice. The arrangement of these facets was the same on all the crystals of the dextro-rotatory compound, whereas the inactive compound turned out to be a mixture of equal numbers of two kinds of crystals. One type of crystal was identical with those of the dextro-rotatory compound, whilst the other type only differed from the first as the left hand differs from the right, or as an object differs from its reflection in a mirror. Could any discovery be more divorced from practical life? Yet this work led to Pasteur's marvellous researches on micro-organisms which have completely revolutionised our ideas of disease, hygiene, food spoilage, etc.

Industrial Research

In Pasteur's case the transition from "academic" research to the elucidation of more practical problems was gradual. His experiments on tartrates led to his first experiments on micro-organisms; he found that *Penicillium glaucum* (the common green mould which so often grows on the surface of fruit and other foodstuffs) grows readily in solutions of the inactive form of tartaric acid, but that it only attacks the dextro-rotatory form. Thus the solution which was originally inactive became capable of rotating the plane of polarised light to the left as a result of the growth of *Penicillium glaucum*.

Pasteur's Work at Lille

Pasteur's first industrial problem was suggested to him when he was Dean of the Faculty of Science at Lille. The father of one of his students came to him for help because of the difficulties experienced in the manufacture of alcohol from beetroots. Sometimes inexplicable changes took place; lactic acid was produced instead of alcohol, and no one understood why. Pasteur was intensely interested and set to work to elucidate the problem. Eventually he showed that the production of lactic acid was due to the growth of a wild yeast instead of the special yeast which produces alcohol. During this period, Pasteur discovered fermentations to be due to the growth of living micro-organisms. His work proved of undoubted benefit to the brewing industry, and twenty years later (after the Franco-Prussian War of 1870) he devoted much time and energy to helping France to brew her own beer instead of getting it from Germany.

In 1865 Pasteur was appointed by the French Government to investigate a disease of silkworms known as pébrine. After five years of most laborious work he had discovered the cause of this and of other diseases of the silkworm, and was able to show the peasants how to obtain eggs which would produce silkworms free from disease.

Theory and Practice

All these early researches helped to lay the foundations on which Pasteur built that later and more important work on anthrax, hydrophobia, etc.—work which has had an immense effect on medical science. In spite of the great practical importance of his discoveries, Pasteur always emphasised the value of pure research. To his students at Lille, he said: "Without theory practice is but the routine of habit. Theory alone can awaken and develop the spirit of invention. It is essential that you especially should not share the view of those limited intellects which despise all science which happens to have no immediate practical application." One remembers in this

connection an exquisite *mot* of Franklin. He was assisting at the first demonstration of a purely scientific discovery. One of the bystanders asked him: "But what is the use of this?" Franklin answered: "What is the use of a new-born child?"

Volta and Oersted

The history of science contains many striking instances of the interplay between pure and applied research. Volta's production of an electric current by means of the Voltaic pile, must be classed as "academic" research. An electric current obtained in this way was used by many experimenters after Volta, of whom Oersted deserves special note. During some experiments he observed that a magnetic needle was deflected by the passage of an electric current in its vicinity and that the needle swung back to its normal position as soon as the electric current ceased to flow. To this observation made by a purely "academic" worker, we owe the invention of the electric telegraph.

Oersted's work was, however, destined to play a wider part in the evolution of science. His researches impressed the owner of the Carlsberg Brewery at Copenhagen with the enormous importance of research, and he endowed a research laboratory. This laboratory (the Carlsberg Laboratory) is now world famous. At the present time, the best known name connected with it is that of Srensen. Every chemist is familiar with the symbol pH, which is a shorthand way of expressing the hydrogen-ion concentration of a fluid. This useful conception was due to Srensen, who is also famous for pioneer researches on proteins. These researches are destined to play an important part in the future of food manufacture. Thus Oersted, quite unwittingly, set in motion a train of events which will bring unforeseen advantages to the food industries.

Willard Gibbs

Willard Gibbs was perhaps one of the most "academic" of scientists. He wrote a book on theoretical thermodynamics which few people have read and still fewer have been able to understand. Yet the appropriate mathematical formulæ for new theories of physical chemistry can often be found in this monumental work. Willard Gibbs had the misfortune to live fifty years before his time, and the fruits of his work still await harvesting. Some day many industries, including the food industry, will revere the name of Willard Gibbs just as they now do that of Louis Pasteur. The theoretical reasoning of Willard Gibbs will enable the theory of solutions both tolloidal and true to be put on a firm basis and is bound to influence our conceptions to an extent as yet unrealised. These new ideas will in their turn have a far-reaching effect on industry, and will open up new fields of enterprise.

Research and Food

Some industries have already realised how dependent their progress is upon that of "academic" research. The electrical industries are probably the pioneers in this direction. They have already organised pure research in the electrical field and, as a result, discoveries have been made with commercial possibilities. The food industries have not yet profited by this example. The formation of the Research Association of Food Manufacturers is, however, a step in the right direction.

The formation of industrial research associations, carefully fostered by the Department of Scientific and Industrial Research, is one of the most inspiring movements in industry since the war. For the future the main problem is how to continue this work without Government aid. In this connection we may mention the bold scheme of the rubber industry. This industry is attempting to obtain Parliamentary powers for the levy of a subsidy on all the rubber used in manufacturing processes. The funds so obtained are to be used to place the Research Association of British Rubber and Tyre Manufacturers on a sound financial basis. The operation of the Bill is limited to five years and the contribution to an average sum of £15,000 a year. This experiment is one which deserves the close attention of all other industries.

(*Continued from page 62.*)

Such considerations impress upon one how very guardedly must analysis figures be accepted when comparing the reputed richness of different varieties of cheese. No arbitrary standard must be accepted; only a general statement of what may fairly be considered as an average of whole-milk cheese. Solely upon these grounds may a grading standard be adopted, subject to absolute verification by chemical analysis.

As regards the amount of sugar shown in the analysis figures for the first Stilton cheese, it is well established that in Cheddar cheese practically all the sugar has disappeared in two weeks after the cheese has gone into store from the press room. With Stilton cheese—ripening more slowly in the beginning from "sweeter" milk—*i.e.*, not so acid—it may take a little longer, but sugar is not a proper component of mature cheese, and the appearance of sugar in an analysis record indicates that it was immature produce.

Salt added to cheese in the process of manufacture increases the ash content. While the amount added ranges from 2 to 4 lbs. of salt to the curd from 100 gallons of milk, this amounts to from 1 to 2 per cent. only in the finished cheese. Stilton cheese is rather lightly salted in comparison with some other varieties, and, naturally, loses some of the salt in the steady drainage, lasting over several days, from this type of cheese. Cheese that is "brined" instead of being dry salted has most of its salt close under the rind.

The presence of salt in cheese has a considerable influence on the speed and character of its ripening. In examination the salt is identified in the flavour of the ripe cheese; it modifies that flavour in a certain degree. An excess of salt also has a definite effect on the consistency of the cheese, disclosed in the physical character of the "taster" or plug of cheese withdrawn by means of the "cheese trier" or boring instrument. It will be dry and brittle. Too little salt admits of a porous texture and is reflected in the flavour, which will be insipid, and probably bitter.

Canned Foods in the Next War

Der Weltkrieg zeigte ein ganz anderes Gesicht als früheren Kriege. Es war ein Kampf um Sein oder Nichtsein, ein Volkskrieg im wahrsten Sinne des Wortes, der wie ein Sturmwind in jeden Winkel des öffentlichen und privaten Lebens fuhr. Es war, um mit dem Kriegsphilosophen Clausewitz zu reden, der wahrhaftige Krieg in seiner absoluten Gestalt. —Ludendorff. (Die überstaatlichen Mächte im letzten Jahre des Weltkrieges.)

The Last War

IT IS related of the late Lord Haig, when, as Sir Douglas Haig, he was commanding the 1st Army Corps at the Battle of the Aisne, that at one stage of the battle, he thought he had discovered, in inadequate rations, the reason for the lack of energy shown by the French Corps on his right. He forthwith ordered the issue to them of ten thousand rations of tinned beef, remarking: "The poor wretches are in cotton clothing and have had nothing to eat but wet bread and raw meat for days. The rations will increase their fighting value and they'll do anything to help us now."

The war which was then only beginning was destined to become, as Ludendorff has described it, "a war between nations in the truest sense of the word, which blew like a tempest through every part of public and private life." It was what the philosopher of war, Clausewitz, styled: "War in its absolute and most real form."

The part played by canned foods in the war has been too rarely emphasised. Tinned biscuits, beef, fruit, butter, margarine, meat and potato rations—the war was won on these. (And perhaps one ought to mention pork and beans.) Even tea. One remembers how petrol tins were first used on the Somme in 1916 for carrying hot tea up the line, and how successful the arrangement was. As a matter of fact, the storage of food, coupled with the prevention of its wastage, has always been one of the major problems connected with armies in the field, and it was Napoleon, in face of this difficulty, who first ordered an investigation into the possibilities of preserving food, as a result of which canning began.

The Next War

Now that war is no longer a purely military affair the problem has become one of storing not an army's food—but a nation's. The following article, reprinted from the *Braunschweigische Konserven Zeitung*, makes interesting reading in this connection. "A Czecho-Slovakian food journal discusses in detail the subject of the Protection of Food in the Next War, and insists that it is the duty of the State to make preparations now for the provisioning of the civilian population and the army during the next conflict, of which the chemical aspect will be the predominant one. It is well known that in Russia and Poland the civil population have to take part in gas drill in order that they may become accustomed to the conditions which would prevail in the event of gas attacks. The Soviet Press has recently treated this question of the Protection of the State in Chemical Warfare with increasing attention.

Food and Poison Gas

"Water and Food will have to be sealed for protection against the effects of gas. The surest way of storing foods under such conditions would be their preservation in air-tight cans, coated in some way to obviate any possible corrosion of the surface. In the article mentioned the actual wording is: 'The few details here given are only intended to remind one of the terrible danger which would arise in the event of a future war, in which poisonous and death bringing gases are certain to be used on a large scale. It is high time that these facts were squarely faced, and as far as food is concerned, that one began to think in terms of such eventualities and to take steps to secure the effective preservation and storing of food in case of gas attacks. This offers to our canning industry a new and absolutely important field of activity.'

A Problem for Canners

"These points are no doubt of interest here in Germany, too (continues the B. K. Z.), and without wishing in the least to introduce politics we dare not leave the thought unmentioned that the German Canning Industry has also this extraordinarily important task to face, although this Industry will have to receive greater recognition and interest from the State than formerly. For instance, such things as the importation of foreign vegetables, the absence of protective tariffs, and so on, will have to be reconsidered as hindrances to the development of our Canning Industry. These, then, are very serious points about the future, and one becomes increasingly aware of the significance that canned foods are to have in the general dietary of the future. To the German it cannot be too often repeated that Agriculture, Fruit Growing, Tin, and all their related industries are bound with the Canning Industry into one."

(*Continued from next page.*)

period or whether one is dealing with summer or winter milk may also have an influence. Further research will no doubt clear up these points in time. Experiments with separated milk have established that the amount of lipoid remaining after churning is small. A litre of skim milk was agitated six times with ether. There resulted 1·764 ether extract=0·176 per cent. Of this 0·215 phosphorus =5·46 per cent. lipoid was determined. Calculation of the lipoid in skim milk based on this gives a figure of 0·00963 per cent.—that is to say, a practically negligible one. According to this it would not seem to be proved that a preponderance of lipoid matter remains in the separated milk.

The Lipoid Content of Butter

By BRUNO REWALD

This article, which appeared in the "Biochemischen Zeitschift," Vol. 202, Nos. 4-6, 1928, is translated from the German. Lecithin is the most commonly occurring of the lipins (originally lipoids). It is typical of the phosphatides, which are organic phosphorus compounds. Lecithin is a yellow viscous substance, which forms a colloidal solution with water. The lipins as a class are fatlike substances of considerable complexity, and differ from the fats themselves in being associated in some way with the proteins of the cell, the associations being very unstable. It has been suggested that the breaking down of this lipin-protein complex results in the death of the cell, in which case the union is essential to life. The lipins are also important constituents of the cell-membranes.

THE ACCOUNTS of the lipoid (lecithin) content of butter vary in the extreme. According to a compilation in Benedikt-Ulzers *Analyse der Fette* (published in 1908) the amount of lecithin in butter is extraordinarily small, between 0·017 and 0·38 per cent., the latter figure being unusually high and will probably prove to be wrong. The same may be said regarding a later compilation—namely, the *Handbuch der biologischen Arbeitsmethoden*, 1925. Here the figures lie between 0 and 0·014 and are, as will be seen, remarkably low.

All these figures, however, contrast very peculiarly with those given for the lecithin content of milk. In this field a large amount of research has been accomplished. Burow's analysis (*Biochemischen Zeitschrift*, 25, 165) shows cow's milk to contain between 0·049 and 0·058 per cent. lecithin. According to this analysis, butter ought to contain some 1·5 per cent. of lecithin—assuming that the whole of the milk fat goes into the butter and that the latter consists of approximately 90 per cent. pure fat. Nerking and Hansell (*Bioch. Zeitschr.*, 13, 148) put the lecithin in cow's milk at 0·064 per cent., and if this amount is correct, the quantity of lipoid works out at about 2 per cent. Earlier work done by Schmid-Mülheim need only be alluded to in respect of the remarkably small amount of lecithin (0·004 per cent.) he found in milk; this figure is practically certain to be erroneous, but, on the other hand, his figures for the lecithin content of butter, 0·15 per cent., are in right proportion to his milk percentage. Later analyses by Osborn and Wakman (*J. of Biol. Chem.*, 1915, 21, 539) put the cow's milk content at 0·27 per cent., which gives the very high figure of 9 per cent. for butter, assuming the milk to contain 3 per cent. fat and that all the lecithin goes into the butter. In any case, it has been variously asserted that only small quantities of lipoid are lost in churning, though really reliable figures are lacking on this point.

As one can see from these data, accounts regarding the lipoid content of milk are very incomplete, and are still more so in the case of butter. Also the methods applied are not uniform, thus adding to the uncertainty there is in this question. For this reason some tests were recently made to establish, if possible, the true lipoid content of butter. Owing to what is after all the small amount of phosphorus involved, special consideration was given to the question of reliable methods which would afford the possibility of quantitative determination, and so a titrimetric method was used in preference to a gravimetric one. (The former was described in the *Bioch. Zeitschr.*, 1928, 198, 103.) Very exact determinations, even of the smallest quantities of lipoic, were successfully obtained. Butter fat was extracted from relatively large amounts. The method was to use quantities of 20 grs. of the butter, digesting with nitrosyl-sulphuric acid and afterwards incinerating.

Three separate butter tests were made. One brand was specially made from whole milk, the second was a German commercial dairy butter from Holstein, and the third was of Danish origin. First, the water content was ascertained and the phosphoric content then determined. The larger quantities were extracted with ether, and so the pure butter fat was separated from accompanying ingredients, such as salt, casein, etc. This was important as, unless care is taken to eliminate the casein, a completely false result may be given. The ether extract was again washed with water, and the pure butter fat which remained after the evaporation of the ether was examined for its phosphoric content. The residue was also subjected to analysis in order to indicate in what quantities non-lipoid phosphorus may exist in butter.

Kind of Butter.	*Water Content.*	*Phosphorus in Whole Butter.*	*Ether (Soluble).*	*Phosphorus in the Ether (Soluble.)*	*Lipoid in the Butter Fat.*	*Lipoid in the Butter.*	*Phosphorus in the Ether (Soluble Residue.)*
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Own churned	7·68	0·084	81·0	0·046	1·17	0·95	0·45
German butter	10·70	0·068	81·6	0·068	1·73	1·41	1·05
Danish butter	10·20	0·081	83·4	0·050	1·27	1·06	0·65

From all these data emerges the surprising fact that the lipoid-lecithin is much higher than was supposed. In each test made it was found to be over 1 per cent. and in one case 1·7 per cent., but the wide differences indicate, on the other hand, that undetermined factors of an unknown kind co-operate in determining lipoid amounts. It may be that the feeding of the cattle plays a part here, as, according to the tests made by Soxhlet, dried hay loses as much as 60 per cent. of its lecithin, so that the influence of feeding on the formation of lecithin may be admissible as one of the factors causing these differences. Pasture fed cattle would give a milk relatively rich in lecithin, and such things as the lactation

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The British Canning Industry

THE ANNUAL production of tin-plates in this country has varied in recent years from about 750,000 to 850,000 tons; of these quantities roughly from 475,000 to 550,000 tons have been exported to overseas markets, leaving for home consumption some 280,000 to 300,000 tons, or around 37 per cent. of the total output. In the United States the production of tin-plates amounts to approximately 1,750,000 tons, whilst exports are something over 250,000 tons, leaving roughly 1,500,000 tons for home consumption. Conditions in the United States have encouraged the development of the canning industry, which has grown to enormous proportions, and absorbs a large tonnage of the American output retained in the country. Comparatively speaking, the art of tin-can making in Great Britain has made little progress, partly due to less favourable local conditions than those which led to the great developments in canning which have taken place in the United States, and partly to lack of the necessary capital to place the industry upon a firm foundation.

It is to be feared that the absence of supplies of good cans at an economic price is hampering the development of the British canning industry. In spite of the fact that can-makers in this country obtain supplies of tin-plates at prices roughly 15 per cent. less than makers in the United States, the prices of cans in Great Britain are from 25 to 30 per cent. more than those ruling on the other side of the Atlantic. This in part arises from the large quantity of defective cans—placed authoritatively at anything up to 25 per cent.—turned out by British makers. This contrasts with approximately 1 per cent. of wasters in the United States. Under these circumstances, some of our best canning firms manufacture their own containers in order to satisfy their particular requirements.

A quarter of a century ago the American canning industry was handicapped by the difficulty of securing suitable containers; but at that time a number of amalgamations took place amongst can-makers, and firms were established, equipped with the latest machinery for the production of first-grade cans. By this means large economies were effected, for, obviously, establishments specialising solely in making cans are able to produce a standardised article at a much lower price than factories making cans solely for their own use. If the British canning industry is to develop and be enabled to fill its rightful place in the general scheme of provisioning the nation, it will have to follow the example of the United States and see that adequate and cheap supplies of cans are available to those who require them.

A development of this kind would automatically increase the demand for tin-plates in the home market, and call for a considerably greater output. In view of the contraction in the export trade in iron and steel from this country, anything that may increase inland consumption should receive every consideration and encouragement. There are, no doubt, great possibilities in this direction. Everyone knows that thousands of tons of fruit and vegetables annually are wasted simply because the supply temporarily exceeds the demand. If this produce could be preserved economically, it should tend to stabilise prices throughout the year, besides enabling fruit and vegetable growers to dispose of the whole of their crops, instead of perhaps selling only a small portion and allowing the remainder to rot because of their inability to obtain a price sufficient to cover the cost of gathering and transport. The same reasoning applies to fish, the abundant supplies of which around our coasts could be placed at a low price within reach of the public if only the large quantities now thrown back into the sea could be cheaply canned. These are the directions in which scientific canning could be made to conserve the already too limited produce of these Islands and neighbouring waters, and at the same time materially increase the demand for steel.

The matter, of course, is primarily one of finance—this applies not only to the canning operations, but also to those who produce or otherwise secure the edible commodities to be canned. If large canning concerns were able to come forward and to offer a fruit grower, for instance, cash down for his entire crop immediately it was ready, they would be able to secure it at a very low price, which, nevertheless, would be more remunerative to the grower than a higher figure on only a comparatively small portion of his crop. The vagaries of the British climate cannot be altogether foreseen; nor can the policy of produce growers and others supplying the canning industry, when huge sums of money have been expended on costly machinery. The ideal arrangement would appear to be amalgamations of tin-plate producers, canning concerns, and commodity producers of suitable variety, so that not only would canners be assured of their supplies of tin-plate and canning products at reasonable prices, but they would in addition be less seriously affected by crop failures. A scheme of this kind, one would imagine, is deserving of the most careful consideration. (*The Iron and Coal Trades Review.*)

Factory Canned Foods the Safest

That factory canned foods are far safer than those canned in the home is stated by Dr. Chas. Hastings, Medical Officer of Health of Toronto, in an article on botulism.

"Canned fruits and vegetables," he said, "done as required by the laws of our country now in the various industries, are really safer than those done in the home, inasmuch as they are, in the interests of the industry and the maintaining of their reputation, finding that it is necessary for them to choose only perfectly sound fruits and vegetables for canning purposes and then having them canned at a definite temperature for a stated time which has been found by investigators to be sufficient in the vast majority of cases to destroy the various germs that may have gained access to the foods."

Food Canning and Welsh Industry

The following are some of the points made by Sir Edgar Jones (President of the National Food Canning Council) in an article which recently appeared

in the *Western Mail and South Wales News Trade Supplement*:

"The result of the British neglect of the use of tin-plate has been the development of a huge import trade of canned foods to a value of over £25,000,000 per annum. If we add to the canned foods other products that are imported into this country in tins, we find that in the form of tin containers 100,000 tons of foreign tin-plate enter this country every year. Taking round figures, the tin-plate production for the United States is now 1,700,000 tons, and they export 250,000 tons, leaving a home consumption of 1,450,000 tons. Taking the population of this country as one-third of the population of the United States, our consumption of tin-plates *pro rata* to the population should be over 480,000 tons. At the present time our actual consumption of tin-plates in this country is about a half of that figure. *If Great Britain developed the industry of canned vegetables on a proportional scale to this new development in the United States*, then, like the tin-plate manufacturers of the United States, we should not need to worry about the loss of other markets due to local production. *Vegetables can be grown in this country as cheaply and successfully as in the United States*, and there is proof that the public of this country require them like the public of the United States.

"It has already been proved that the English canned strawberry is a product that can hold its own against any competitor, and that a large export market is waiting for it. The canners will want another 2,000 tons of strawberries, which will probably be absorbed by the home market alone. Has any responsible authority adequately explored the possibility of some part of South Wales being able to produce strawberries on a commercial scale?

"There is an urgent call at the present time for financial interests to explore the possibilities of finding alternative industries in South Wales in place of the diminishing coal industry. A big move has already started to expand the canning of fish, and a substantial export trade in canned herrings has already opened up. There appear to be possibilities in the canning of fish in South Wales as in other parts of the country. The wastage and losses in connection with milk are leading to an increased canning of milk and cream in this country to take the place of the imported milk and cream. Is South Wales getting full value for its production of milk and cream? Why cannot the producers add a canning factory to their advantage like the producers in other countries?

"Since the war Americans have canned and by their commercial methods persuaded the American

(*Continued on page* 80.)

THE GATHERING OF THE CANS.

The Canners' Convention recently held in Chicago was the largest gathering of business men ever held. The above is our Artist's impression of the discussion of a sub-committee on Canned Ice Problems.

Recipes

Tea Variations

By CHRISTINA MCLEAN

Tea may be served in a variety of ways, thus providing a welcome change from the ordinary method. Russian tea, for example, is greatly appreciated alike by children and grown-ups, for the reason that one may drink unlimited quantities of it without harm. Another virtue advantage Russian tea has over all other varieties is that the pieces of lemon which accompany it act as a tonic on the stomach.

Most people spoil Russian tea by making it too strong. Half a teaspoon of the dry leaf to every two persons is the correct proportion; this ought to make the beverage a pale straw colour. Real Russian tea is made with the China leaf, and never with the Ceylon or the Indian leaf.

To make the tea prepare it in the usual manner, then drop pieces of lump sugar into glasses and pour in the tea. Just before serving drop a thin slice of lemon into each glass.

To make tea punch use one heaped teaspoonful of the leaf to each quart of boiling water; cover and allow to draw for five minutes, then strain, sweeten to taste and allow to cool. Half fill a punch bowl with small pieces of ice, add the strained juice of a lemon together with the tea. If desired small pieces of fruits such as cherries, pineapple, or bananas may also be added. This makes a delicious thirst-quencher during summer.

Iced tea is made by placing small lumps of ice in glasses and pouring the prepared tea (which should be quite cold) into them; just before serving drop a thin slice of lemon into each glass. Another way is to add a few whole cloves to the tea while it is hot, and when cold, strain and serve without the slices of lemon.

To make milk tea pour two cupfuls of fresh milk into a saucepan and, when tiny bubbles appear around the edges of the milk, throw in one heaped teaspoonful of tea leaves tied rather loosely in a muslin bag. Allow to simmer (pulling the saucepan to one side if the milk shows a tendency to boil over) for about two minutes before pouring it into the pot.

Three Haddock Recipes

Creamed Haddock

Place some fillets of haddock in a well-greased tin, dot with pieces of margarine, sprinkle with lemon juice, and cover with greased paper. Bake in a rather hot oven for 20 minutes, then place in a hot dish suitable for sending to table. Make a white sauce from the gravy in a tin and pour over the fish. Sprinkle with 1 oz. browned bread-crumbs and serve with slices of lemon and a few sprigs of parsley.

Haddock with Parsley Sauce

Fillet and wash a haddock, roll up neatly, then place in a greased tin. Sprinkle with lemon juice and salt, cover with greased paper, and bake in a hot oven for ½ hour. Prepare a parsley sauce, pour over haddock, and serve as hot as possible.

Haddock and Tomatoes

Place in a well-greased pie-dish several fillets of haddock, cover with a layer of sliced haddock, and sprinkle with seasoning and bread-crumbs. Fill the dish with alternate layers of haddock, tomatoes, and bread-crumbs, covering with a rather thick layer of bread-crumbs. Dot with small pieces of butter and bake in a hot oven till the bread-crumbs are a golden brown.

Fancy Egg-Fruit Syrup Beverages

By E. V. BOYES

PART I.

There may be too many beverages already on the market, yet something particularly nice and attractive will always find patrons. The following series of sixteen choice combinations have great dietetic and some medicinal properties, and will surely create a large demand wherever introduced.

They are admirable for consumption in all seasons, and there is plenty of time to take the necessary steps towards placing them on the market for the coming summer.

Beverages of this class are a great advance on the usual carbonated drinks, being, in truth, food and drink combined. They are even superior to milk, and have a worthy vitamin value. They should prove particularly acceptable to dyspeptics, vegetarians, and others who exercise discriminating care in the partaking of foods and drinks, even though, by some, they may be labelled as "food faddists."

And as for young people, who appear to divine at once whether a thing is good or bad, they consume these combinations with gusto, and, like a celebrated youth whose initials are O. T., they are ever asking for more.

The title given to each mixing denotes the prominent fruit flavour in each combination.

Ambrosine.

128 ozs. vanilla syrup.
128 ozs. strawberry syrup.
16 ozs. cider or port wine.
8 ozs. phosphatic acid solution.
16 lbs. eggs.

The syrups are to be taken in fluid ozs., the eggs by weight, or if by counting, then eight normal sized eggs are reckoned as one pound.

Mix the ingredients together either by hand or with a machine-beater, but good mixing only is required, and not drastic beating to knock the eggs into a foam.

The syrups mentioned are the ordinary good quality fruit syrups. The addition of the cider or wine

will not make the beverages legally alcoholic as the amount of alcohol present is negligible, and they round off the flavour nicely in addition to imparting a slight preservative effect.

The syrups, to cheapen, may be made of plain sugar syrup, acid, colour, and fruit essence if desired, but the real fruit syrups are the best for meritorious mixtures, such as these beverages are claimed to be. However, there is no harm in using vanillin in the vanilla syrup.

Phosphatic Acid Solution. This should be prepared and kept in a jar for use as required. Take 160 grains of phosphate of potash, 320 grains magnesium phosphate, 160 grains phosphate of soda, 1 oz. phosphate of lime, 16 fl. ozs. artho-phosphoric acid, and enough water (preferably distilled, or at least boiled) to make 128 fl. ozs. altogether.

The eggs should be strictly fresh, and should be broken separately, in case of a bad or musty one, as sometimes happens even with new laid eggs, then the bulk will not be contaminated. The canned liquid eggs are useable, especially those preserved in sugar syrup, but allowance should be made for the sugar as it affects the weight of eggs, also the sugar in the fruit syrups. Preservative, as boric acid, etc., should be guarded against in these canned eggs, but a little salt, if present, will do no harm, on the contrary, a little salt rather improves the beverages, as it rounds off the egg flavour. Cerebos salt can be added.

These beverages may be put up in large or small bottles, but the most suitable container is a squat or vase-shaped bottle now coming into service for the better class fruit wines or syrups, cordials or liqueurs, or whatever they may be called.

Some legal or official preservative may be added, but a good method of preventing fermentation, etc., is to submit the goods to a partial pasteurisation, but not at so high a temperature as to coagulate the egg. This, in combination with a good airtight seal, will keep the contents in good condition.

Partial sterilisation, as practised by many, is carried out by "processing" the bottles for 30 minutes at 140° F., but, in our case, a lower temperature is desirable on account of the eggs. Experiments have demonstrated that if a bottle is sealed with a cork—an ordinary cork—the tightness of the seal depends on the pressure exercised by this cork against the inside of the bottle neck. This cork, on account of its elasticity, tends to swell back to its original diameter, pressing against the sides of the neck, and, therefore, the bigger the cork, the more it has been squeezed to get it into the neck, the more strength it will possess, and the tighter the sealing.

Practical work has taught us that a cork can only be squeezed 50 per cent., or one half its thickness, into the neck of a bottle; its airtightness is, therefore, quite limited, while with the patent caps (Phœnix, etc.), experience shows that the cork washer is squeezed to one fifth of its original thickness, and is held there and does not give way even if a bottle is heated to 212° F. The viscose cap, as used for perfumery and toilet goods, seems a neat and serviceable capsuling method and quite airtight. In processing, to avoid breakage, raise the temperature slowly up to the required degree. To avoid the bursting of bottles during processing, take care they are not filled too much. The heat expands the liquid, and inside the bottle its level raises and compresses the air within the bottle. The air is very compressible, and the liquid is not; if there is a very small air space in the bottle it will not be sufficient to allow for the expansion of the liquid, and the force of this expansion will cause the bottle to leak or burst. With an airtight seal, therefore, they cannot help bursting, so great care should be given to the proper filling. In a bottle sealed with an ordinary cork, the air space is small, as the cork being driven into the neck takes a good deal of room; the bottles which are to be processed must, therefore, be filled much less to avoid bursting. Bottles with a patent cap can be filled 1½ inches higher up without reducing the necessary air space within, the air space not being compressed by the space occupied by the cork.

(*Recipes to follow in next issue.*)

Enquiries

The following are extracts from letters we have lately received. We shall be glad to put interested parties in touch with the writers, or to insert replies in the Correspondence columns.

45. Required: a preservative to be used in putting up cooked fish in glass containers, conforming to the new Food Regulations.

* * *

46. "Could you obtain for us a formula that will prevent salad cream from separating, and also a formula for a good sweet pickle?"

* * *

47. "I am experimenting with a cube which is to contain extracts of beef, marrow-bone, and yeast, and should be obliged if you could let me know the best ingredient I could put into my preparation to make it set hard, that would stand both winter and summer weather."

* * *

48. "I wonder if any of your readers could recommend me an up-to-date book touching on 'Preserve Factory Management,' and including recipes?"

* * *

49. "At present we are looking for a small machine which will feed a fine form of semolina into sample cartons.

"The net weight of a sample is approximately 2¼ ozs. We have in our minds a machine which will measure rather than weigh the exact quantity, since this particular case does not call for extreme accuracy in weight. The machine should have a considerable range of working speeds from as low as 8 per minute up to 16 or 17 per minute according to the number of hands serving it. It would be used to measure this one quantity only, and none of the facilities of adjustment for other quantities are necessary."

* * *

50. Wanted: the name of a firm which supplies roasted almonds.

The British Industries Fair

(Specially Contributed.)

THE FIRST few days of the Fair were marred by the extremely cold weather, but during the middle of the first week, thanks to the adequate heating arrangements and the improvement in the weather, visitors became more numerous and it seems, as we go to press, that the fair will prove to have been a huge success.

Two facts impressed themselves on one with increasing force as one passed through the Colonial and Dominion halls. The first was the unbelievable range of Empire produce—the Empire has harvests in every month—and the second the number of first-class Empire products which we seem to reject in favour of foreign wares.

The Canadian Section was a revelation, but a description of the Empire's Granary is hardly necessary.

Australia.

Some noteworthy exhibits in "Australia" were the canned fruits (why do we import so many of these from U.S.A.?), Golden Wattle honey—of high food value—the well-known Australian wines, and—butter. At the Islington Dairy Show, Australian butter has won 28 first prizes out of a possible 31, gaining also 2 seconds and 1 third prize during the last 3 years—interesting figures.

Malaya.

Malaya was well represented, the food products exhibited being tapioca, coconut, white pepper, and tea. The latter is being grown experimentally by the Government now, but it is not yet on the market. Perhaps one ought to mention the product of the *Jelutong*—a cousin, so to speak, of the rubber-tree—used in the manufacture of chewing-gum. The principal destination of most of this commodity it would be, perhaps, superfluous to mention. Coconuts and palm kernels are also exported on a large scale, as also palm kernel stearine, which is used in cooling tin-plate during a process of its manufacture. Oil palms are now being grown on a plantation basis. An interesting point in this connection is the low percentage of fatty acid (5 per cent.) in Malayan palm oil, the absence of fatty acid being the deciding factor in determining the price of palm oil. The usual percentage is 12 to 15 per cent.

Cyprus.

Cyprus is now exporting marmalade, the first consignments having just been put on the market. Another interesting feature about the Cyprus stand was the brandy exhibited.

The West Indies.

The history of the islands of the Caribbean Sea is closely bound up with that of sugar, and since 1797, when Trinidad became a colony, one of its principal industries has been the cultivation of the cane. It was not until 1830, however, that the industry really extended, and in that year a business was begun by Turnbull, a Scotsman, of course, which was to become the famous Caroni company of to-day.

Cane sugar has had a hard fight for it since beet sugar made such advances, aided as it often was by State subsidies, especially in Central Europe, but progress is maintained and the demand for cane sugar increasing. An important feature of the West Indies stand was the show of confections containing arrowroot from St. Vincent. St. Vincent arrowroot is a very pure form of carbohydrate, excellent for combining with proteins.

Sierra Leone.

The principal exports of Sierra Leone are palm kernels and oil (nearly £1,200,000), kola nuts (which are supplied to other parts of the West Coast of Africa, being used as a stimulant by the natives), ginger, cocoa, and rice. Imports are chiefly from Great Britain.

Imperial Chemicals.

An outstanding exhibition of the fair was that of I. C. I., Ltd., which, by the artifice and technique of display and arrangement, conveyed an impression of the united front presented by over forty subsidiary and associated companies operating throughout the Empire and the world. There are few food industries which do not use chemicals in one form or another, and food manufacturers visiting the fair doubtless found this stand as interesting as did the makers of dyes, etc.

Jams.

Chivers and Sons, Ltd., of Histon, Cambridge, showed Old English and grapefruit marmalades in addition to their usual well-known lines. The speciality on this stand was the hermetically sealing patent cover which is replaceable. Chivers were the first English fruit growers to have their own canning factory. At present they have 6,000 acres of fruit farms, and during the season employ 4,000 hands. We were glad to hear that these pioneers of the English fruit canning industry are competing successfully with Californian preserves in a world-wide export trade.

But the stand which seemed to attract the most people in the Food Section was that exhibiting Crosbie's jams. These are sufficiently well known and need no comment. Crosbie's products are 100 per cent. Empire, all their fruit being grown at Laceby, Lincolnshire, where the factories are, except oranges, which are from Cyprus, apricots from South Africa, and raspberries from Tasmania.

The speciality on Crosse and Blackwell's stand was the range of "sixpennies" which this firm have had on the market for some time, and which includes beans, soups, relishes, pickles, sauces, and potted meats.

Confectionery.

Huntley and Palmer were showing "Horlick Biscuits," a new line of biscuit in which malted milk is incorporated, and "Bisco Rye," a new rye biscuit. These are an innovation from Sweden, whence the latest processes and also skilled labour have been brought to Reading. It will thus eventually become a British product. Another interesting feature of this stand was the display of biscuits packed in "Crispak," a paper container which was demonstrated to be water-tight and is also said to be air-proof. In using this packing Huntley and Palmer are making no addition to their prices.

Carr's of Carlisle were specialising in their "Club Cheese" biscuit, of which they sell five million packets a year. The cheese is put into this product in the first process of manufacture.

The stand of the Soya Flour Manufacturing Co. resembled more the counter of a Viennese café, so many and varied were the kinds of cakes, biscuits, and bread exhibited. These were produced with the addition of "Soyolk," the soya flour manufactured by the Berczeller process, which is being marketed at 4d. per lb., and which is an admirable shortening agent. Thus has the soya bean, of which one is beginning to hear so much, been put to yet another use.

Fruit Juices.

A striking display was given by Fruit Products, Ltd., who manufacture orange and lemon juice in two factories at Slough. The trade name is "Golden Shower," a brand which has achieved a large success in South Africa. Supplies of fruit just now are coming from Spain, but it is hoped to import from South Africa and Florida in time.

Kia-Ora orange and lemon juices are now exporting on a growing scale. Their fruit derives principally from Messina and Spain.

Milk Products.

One of the most interesting stands in the Food Section was that of the West Surrey Central Dairy Co., Ltd., who market "Cow and Gate" milk food and dried milk preparations. "Cow and Gate" milk food gives a standard gravity when mixed with seven parts of water. This preparation is standardised the whole year round, and is sterile to pathogenic organisms, bacteria counting less than 150 per c.c. A half-cream preparation was shown which would meet cases in which the fat content is required to be lowered. The specialities on this stand were "Lacidac," a full-cream dried milk combined with B.P. lactic acid to such strength that when made up Marriot's formula is given; "Hemolac," a combination of full-cream with iron ammonium citrate useful in the treatment of anæmia; and "Lacquin," which is full-cream milk combined with coffee and quinine in a proportion calculated to give ½ grains of quinine in a breakfast cup. As a prophylactic against influenza and in cases of tropical diseases the latter should be of use.

Drugs and Essences.

The stand of the British Aromatic Chemical Works was interesting in its display of "Citral Citron," terpeneless oils, and a large range of flavouring essences, such as vanilla from Bourbon beans, which is a powerful essence giving good results.

The range of Messrs. A Boake Roberts and Co.'s essences and fine chemicals are too well known to readers of this journal to need any enumeration here, and these were all displayed with an artistry that was the admiration of this section of the fair.

Stevenson and Howell, Ltd., are equally famed for their flavouring essences of all kinds for use in the food manufacturing industries and their colours for food products.

In the same category there was an interesting stand to be seen at K 106, where W. J. Bush and Co., Ltd., had their range of essences, food colours, and cream of tartar well displayed.

Other Exhibits.

The British Drug Houses, Ltd., made a special feature of "Radio-malt"—a highly scientific production incorporating a high content of the A and B vitamins, and an ample supply of the anti-neuritic vitamin B.

Aplin and Barrett, Ltd., makers of "St. Ivel" cheese, had on view a 30 lb. "Chedlet" (cheddar, rindless) cheese, which they had previously shown at the Hamburg exhibition.

The stand of the Peerless Electrical Mfg. Co. attracted much attention by its display of electric mixers and beaters. Some of the special points about these were, single lever control, an unbreakable beater-holder, single unit construction and automatic lubrication.

General Impression.

It was obvious that the fair was a great advance on last year's, and the impression which remained after walking past the miles of stands was one of British Industry in a fighting and optimistic mood. If the publicity and enquiries gained here are followed up by aggressive salesmanship, then the British Industries Fair of 1929 will prove to have been a great success.

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Foreign News

Sugar

WE PROPHESIED some time ago that we should see the game of follow-my-leader in the matter of raising Customs duties on sugar. The latest to join the happy band is Italy; a decree appeared a few days ago raising the actual duty of 24 liras 75 (gold) to 36 liras (gold) per 100 kilogrammes, and the local Press tells us that this considerable increase is not a fiscal measure, but an economic step to make Italy entirely independent of foreign sugar.

It is prophesied that in the next season Italy will produce some 350,000 tons of sugar—that is to say, more than sufficient to cover home consumption.

Perhaps we shall see Italy in a few years trying to export—*i.e.*, to dump. With such high protection, production is bound to develop, as the country has some powerful companies, able to find plenty of capital, for instance, the Belgian group: who will come next? Probably Poland, and it is by no means impossible that France will follow suit; at any rate, our agriculturists are doing everything that is necessary.

Austria had also made up her mind to become independent, and to close another gap for Czecho-Slovakia, and so an important factory is to be built, the capital being provided by the well-known Kreditanstalt. Contracts for beet have been given out, and work has actually started on the factory.

Though Russia has made a great effort as regards sugar, about the only industry in which some measure of success has been achieved, the Trust does not intend to rest on its laurels, and the local Press tells us that in view of the disappointing results of last campaign, a vigorous effort is to be made to obtain more roots this year.

Relief is to be given to growers in the way of taxation, contracts are to be offered for five or six years, roots are to be paid for on their sugar contents, the peasants are to be encouraged to get together and make group contracts for considerable areas, against which advances will be made, agricultural machinery provided, and so on.

The old story—everyone striving to produce more!

Germany, after enjoying a short period of cold weather, went back to mild, rainy conditions.

While the final figures as to the last season are not yet available, the quantity of roots harvested is estimated at 11,313,900 tons, compared with 10,657,000 tons, 1927-1928. The rendement is said to equal 16·10 (15·53); this would give a production in raw of 1,821,500 tons, plus some 20,000 tons of sugar extracted from molasses.

Our Berlin *confrère* is not very optimistic as regards the prospects for this year, as imports of foreign sugar still weigh on the market. Consumption for last campaign is expected to show an increase of 5 per cent., and would thus amount to about 1,710,000 tons. There should be a surplus of some 200,000 tons, which would have to be exported at a loss, and the maximum price of 21 marks fixed by the Government is not considered sufficient to give compensation to manufacturers.

Our *confrère* holds out a prospect of fresh agitation, not this time as regards the raising of customs duties (as they now completely shut out foreign sugar), but with a view of increasing the maximum of 21 marks.—*Le Journal des Fabricants de Sucre.*

Aid for German Science Abroad

It is reported, from French sources, that during 1927 Germany spent 8,000,000 marks on aid to German science abroad, 7,000,000 marks on German undertakings abroad, and 2,500,000 marks on a technical emergency corps.

Chocolate Losses in France

So far as the market is concerned, we have begun the year with a firmer tone, and at the annual general meeting of our great refining concern, Say's, the chairman was decidedly optimistic as to the future, pointing out (quite correctly) that our market was fully protected, that we were producing less than we consume, and that there was no reason to fear any considerable fall in prices, these being (notwithstanding the recent drop of ten francs or so per hundred kilogrammes) considerably above those ruling in 1927.

If the sugar factories are doing well, this cannot be said to be the case with manufacturers of jams, sweets, and so on. We noticed that one of our leading chocolate concerns comes out with a balance-sheet showing a loss of over four million francs. It is true that in France, and increasing yearly, the manufacture of chocolate tends to become a monopoly of the great firm of Menier, which owns a number of supposedly independent concerns.—*Le Journal des Fabricants de Sucre.*

Import Trade in Meats and Lard

The total volume of meat imports into the United Kingdom during the period 1925 to 1928, inclusive, was maintained at practically constant levels, the most marked fluctuation being an increase of but $1\frac{3}{4}$ per cent. in 1927 over 1926. The accompanying table emphasises the relatively unchanging flow of imports of meat.

Imports of meats including lard into the United Kingdom

(In thousands of pounds).

Kind.	1925.	1926.	1927.	1928.*
Beef	1,538,948	1,616,075	1,622,292	1,280,041
Pork (including Bacon)	1,159,668	1,084,364	1,123,149	998,639
Mutton and Lamb	625,341	615,442	632,611	561,098
Lard	255,819	252 470	268,356	235,065

* For the first 10 months, January to October, inclusive.

Latvian Butter Exports

The Latvian Legation in London reports that, during 1928, exports of butter amounted to 13,200,000 kilogs., valued at 49,300,000 Lats, the bulk of which went to Germany and Great Britain.

Sources of Imports into Australia during September Quarter, 1928

H.M. Senior Trade Commissioner at Sydney has forwarded a statement showing that the total value of imports into the Commonwealth of Australia, September 30, 1928, was £32,200,692. Of this amount the United Kingdom provided £12,916,232, the United States £7,598,504, the Dutch East Indies £1,610,687, Japan £1,450,788, Germany £1,072,145, France £914,580, and Canada £853,542. The following table gives particulars of the imports of the various food products.

Class.	*United Kingdom.*	*Canada.*	*France.*	*Germany.*	*Japan.*	*Dutch East Indies.*	*United States.*	*Total, all Countries.*
	£'000.	£'000.	£'000.	£'000.	£'000.	£'000.	£'000.	£'000.
Foodstuffs of animal origin, but excluding live animals	113·7	46·1	·7	·5	25·7	·7	88·2	423·4
Foodstuffs of vegetable origin, non-alcoholic beverages	121·7	2·0	10·3	1·9	14·6	475·8	77·9	1,416·9
Spirituous and alcoholic liquors	335·0	·2	35·6	·6	—	—	—	445·4
Live animals	14·6	—	—	·1	—	·4	1·4	32·2
Animals, substances (mainly) unmanufactured) not foodstuffs	117·3	1·9	3·9	5·3	58·9	16·3	16·9	504·1
Vegetable substances and fibres	27·4	—	14·3	4·4	10·7	90·1	24·9	672·6

Portugal

TINPLATE AND FOODSTUFFS

A firm of commission agents in Lisbon, who also receive consignments on their own account, are desirous of securing the representation of British exporters of the above.—(Ref. No. 94.) Board of Trade Overseas Dept.

New American Chain

Clarence Saunders of Piggly Wiggly fame, backed by some 20 millionaires, expects to develop, within 5 years, a new $50,000,000 self-service chain of grocery stores throughout the country, "doing a gross business of a billion dollars in 5 years." There are now 52 stores in operation, whose yearly business amounts to about $140,000 each.

Saunders, it will be recalled, started the Piggly Wiggly stores in 1916. As the result of a stock deal in 1923, he lost control of Piggly Wiggly. In the period which followed he was busy clearing up law suits and debts. In March, 1924, with $12,000 borrowed from friends, he again went into the chain grocery business and organised the Clarence Saunders Stores. He spent $6,000 of the $12,000 in advertising during the first month. Judging from the earnings of $235,843 of 49 stores, his confidence in advertising was not misplaced.—*The Glass Packer.*

Canadian Canned Foods Import Regulations

The administration of that part of the law which has to do with grading and labelling of canned foods produced in Canada or shipped into Canada has been transferred from the Veterinary Director General to the Fruit Commissioner, with the exception of milk and milk products, which still remain under the Veterinary Director General. As a result of this change, the old orders have been cancelled and new ones issued, but the new orders, which have been carefully compared, do not differ from those which have been in effect.

No Canning in Haiti

Bananas, oranges, limes, pineapples, mangoes, and other tropical fruits are grown for local consumption in Haiti, but no fruits or vegetables are canned; jams and jellies are made in small quantities. An American company has stated its intention to erect a plant for canning pineapples as soon as sufficient production of fruit for canning is developed.

Canada's Sugar Industry

Canada's consumption of sugar in 1927 works out at practically 86 lbs. *per capita* compared with 93 lbs. in the previous year, 94 lbs. in 1925, 90 lbs. in 1924, and 81 lbs. in 1923. These figures, which show a considerable variation in the apparent consumption from year to year, are based on the amount of sugar made available for consumption in Canada. In a comprehensive report on "The Sugar Refining Industry in Canada, 1927," the Dominion Bureau of Statistics, the amount of granulated sugar refined in Canada that year from imported raw cane sugar is set out at 811,084,788 lbs. Granulated sugars manufactured from Canadian-grown sugar beets amounted to 60,969,131 lbs., and soft sugars from cane to 107,079,213 lbs., a total production in Canada for all grades of sugar in 1927 of 979,133,132 lbs. valued at $59,718,424.

Imports of refined sugars into Canada amounted to 34,822,300 lbs., valued at $1,594,438, and exports to 195,752,100 lbs. valued at $8,933,619, leaving the amount of sugar available for consumption in Canada during the calendar year as 818,203,332 lbs. valued at $52,379,243, a consumption *per capita* of 85·95 lbs. worth $5·50. Though the consumption *per capita* shows a considerable decrease, the average cost *per capita* of Canada's population increased from $5·14 in the previous year.

Exports of Canadian sugar in 1927 similarly fall below 1926 and 1925, but were higher than in 1924 and 1923, the figures being: 1923—119,000,000 lbs.; 1924—84,000,000 lbs.; 1925—305,000,000 lbs.; 1926—285,000,000 lbs.; and 1927, 196,000,000 lbs.

Notes on Canadian Fishing Industry

A statement issued by the Deputy Minister of Fisheries at Ottawa indicates that when official returns are received it will be found that the Canadian fishing industry secured a total production in 1928 valued at $54,000,000, as compared with $49,497,038 in 1927. In the two leading provinces, British Columbia and Nova Scotia, the catches of the prin-

cipal varieties of fish were considerably greater than for several years past.

The total investment in the Canadian fisheries is stated to be about $52,000,000, and about 85,000 persons are employed in the catching and processing of the product. The annual value of the catch, it will therefore be seen, is greater than the total investment.

A new departure in Canadian fishery enterprise is shown by the action of one of the leading Nova Scotia companies in establishing a branch plant in Boston, Massachusetts, in order to compete more successfully for the American trade. A large wharf property has been leased, and a suitable plant constructed. Two steam trawlers have been secured from England, and it is proposed to operate them in connection with the Boston plant.

The Canadian dried fish trade for 1928 experienced a successful season. In the ten months ending November 1 the production was about 430,000 quintals. Of this quantity, Nova Scotia produced nearly 260,000 quintals. Lunenburg, the home of the Grand Bank fishing fleet of 75 vessels, was responsible for 244,000 quintals. The prices have increased during the year. The last advices were that the summer catch sold at $9·00 per quintal, or about $2·50 per quintal more than 1927. The major portion of the product is exported.

Food Exhibition to be held in Essen, Germany

A Foodstuff Exhibition is to be held in the city of Essen from May 29 to June 9, 1929, under the auspices of the "Rekofa," or German Exhibition for Colonial Products and Fine Groceries. Large importers and dealers in grocery products are planning to exhibit. Among the members of the "Rekofa" Association, are included over 500 purchasing co-operations and organisations whose members purchase several hundred million marks' worth of foodstuffs every year. In similar fairs a number of foreign dealers in food products have exhibited, and the exhibition next year will be glad to include British firms or their representatives in Germany.

The city of Essen is located in the Ruhr district with a population of nearly 8,000,000 persons. This gives an idea of the significance of the exhibition for dealers in foodstuffs.

Our most Expanding Industry

AT the annual luncheon of the National Food Canning Council, Sir Edgar Jones, Chairman of the Council, stated that the present pack of peas and other vegetables in the United Kingdom was only about 1,000,000 cans per year.

In proportion to the population he estimated that this country should be packing about 800,000,000 cans per year. He further stated that, owing to its rapid expansion, the canning industry of this country had already gone ahead of the growers, and that the co-operation of growers and canners was needed for further growth. The aid that the medical authorities could give in overcoming the public prejudice toward canned food was also emphasised.

Attack on Food

IN connection with the "Don't nibble Fattening Foods" advertising to which we alluded in our February issue, we are informed by Mr. C. Fisher, the advertising manager of J. Wix and Sons, who manufacture "Kensitas" cigarettes, that this particular campaign has been definitely closed. Its premature end was no doubt due to the determined position taken up by the Sweet Food Industries, although the campaign never was intended to rival that of the American Tobacco Co. We are glad it is finished, however, because, whatever Mr. George Washington Hill or anybody else may say, the thing was *not* in good taste. Those "Don't nibble" advertisements were not as good as really good advertising can be, and we were always a little surprised that this firm, marketing as it does wares of undoubted high quality, should have descended to what we described last month as cut-throat tactics.

A New Test for Boric Acid and Borates. By A. Scott Dobb, B.Sc., F.I.C. (Meeting of Public Analysts.)

The pink coloration produced by the addition of mannitol and methyl red or sofnol indicator No. 1 to a neutral solution is characteristic of boric acid, a distinct reaction being obtained with as little as 0·2 mgrm. The only substances causing any interference with the distinctness of the reaction are phosphates, arsenates, chromates, and tungstates, and in their presence it is difficult to ascertain the exact point of neutrality. Tungstates differ from all the other substances examined in giving a reddish-pink colour similar to that given by boric acid, but the reaction takes place much more slowly than with boric acid.

(*Continued from page 73.*)

public to consume 250,000 tons of cabbage in tins, and that American tinned cabbage is selling in London and other cities of this country already in increasing quantities. Cabbage can be grown in South Wales and other parts of this country as well as in America.

"Is it not a reproach to our commercial enterprise that we allow such things to be imported when the importers have no advantages in the raw materials or the cost of production? One is driven to the conclusion that for some reason or other there is a considerable paralysis in this country of the spirit of adventure and enterprise, and until that spirit can be revived and a due recognition brought about of the success of the canning movement in other countries of the world we shall not get on as fast as we ought to. Progress is being made, but it is in the interests of South Wales that that progress shall be hastened as much as possible by combined and vigorous action on the part of all who are interested in the future welfare of the Welsh industry."

Commercial and Legal News

(The Editor does not accept responsibility for any errors which may occur in the following notices.)

New Companies

The undermentioned particulars of New Companies recently registered are taken from the Daily Register compiled by Jordan and Sons, Limited, Company Registration Agents, 116-118, Chancery Lane, London, W.C. 2.

G. H. ING AND COMPANY, LIMITED. (236114) Regd. January 3, 1929. To take over the bus. cd. on at North St., Wisbech, as "G. H. Ing and Co.," and to carry on the bus. of wholesale and retail fruiterers, florists, nurserymen, etc. Nom. Cap.: £500 in £1 shares.

G. F. PALMER, LIMITED. (236150) Regd. January 4, 1929. To take over the bus. of a baker, confectioner, caterer, and wine and spirit mcht., etc., cd. on at 28, Stert St., and 9, Market Place, Abingdon, Berks., as "G. F. Palmer." Nom. Cap.: £3,000 in £1 shares.

RADCLIFFE'S EDIBLE PRODUCTS, LIMITED. (236169) Regd. January 4, 1929. Factory Yard, Miller Street. Manchester. To take over the bus. cd. on at Manchester and elsewhere as "George H. Radcliffe, Ltd.," and to carry on the bus. of wholesale and retail provision dlrs. and mchts., produce mchts., grocers, seed crushers, dlrs. in and refiners of cotton, seed and other vegetable oils, tallow and other fat dlrs., etc. Nom. Cap.: £100,000 in 150,000 preference shares of 10/- each and 500,000 ordinary shares of 1/- each. Minimum subsn.: 7 shares.

CAMS, LIMITED. (236175) Regd. January 5, 1929. 45, West Street, Bognor, Sussex. To acquire land and bldgs. in England, and to carry on the bus. of hotel keepers, wine and spirit mchts., etc. Nom. Cap.: £7,000 in £1 shares (3,400 pref., 3,000 "A," and 600 "B").

SYNOT, LIMITED. (236190) Regd. January 5, 1929. To take over the bus. of mnfrs. and vendors of a preparation called "Synot" cd. on at 49, Old Bond St., and 40, Gerrard St., W., by John Scott and Co. (London), Ltd., including the trade mark "Synot," and to carry on the bus. of mnfg. and retail chemists, etc. Nom. Cap.: £2,500 in 2,000 preference shares of £1 each and 10,000 deferred shares of 1/- each.

CANDYCRAFT, LIMITED. (236195) Regd. January 5, 1929. 8, Harrington Street, Liverpool. To take over the bus. of a chocolate mnfr. and manufacturing confectioner cd. on at Rosemont Rd., Hampstead, as the "Candycraft Company." Nom. Cap.: £10,000 in £1 shares.

PRITCHARD AND CONSTANCE (HAYMARKET), LIMITED. (236220) Regd. January 7, 1929. Walbrook Chambers, 38, Walbrook, E.C.4. To carry on the bus. of chemists as formerly cd. on at Haymarket by W. Robinson. Nom. Cap.: £5,000 in £1 shares (4,000 pref. and 1,000 ord.).

PROVISION TRADERS, LIMITED. (236221) Regd. January 7, 1929. 116, Clifton Street, Cardiff. To carry on the bus. of grocers and provision mchts. in all its branches. Nom. Cap.: £5,000 in £1 shares.

JAMES WHITWELL (TORQUAY), LIMITED. (236236) Regd. January 8, 1929. To carry on the bus. of hotel, restaurant, café, tavern, and refreshment room proprs., etc. Nom. Cap.: £50,000 in £1 shares.

NORTHERN BEEF COMPANY, LIMITED. (236238) Regd. January 8, 1929. "Marlborough House," Churchill Street, Newcastle-on-Tyne. To carry on the bus. of importers, exporters, buyers, sellers, and distributors of meat and other produce, etc. Nom. Cap.: £5,000 in £1 shares.

SCOTCH STORES, LIMITED. (236240) Regd. January 8, 1929. 50, North End, Croydon. To carry on the bus. of dlrs. in wines, spirits, beer, and aerated waters, etc. Nom. Cap.: £7,500 in £1 shares.

SMEED'S FARM DAIRY, LIMITED. (236241) Regd. January 8, 1929. 40-42, Oxford Street, W.1. To carry on the bus. indicated by the title. Nom. Cap.: £500 in £1 shares.

J. W. LOCKING, LIMITED. (236254) Regd. January 9, 1929. To take over the bus. of a tobacconist, confectioner, fruit and vegetable mcht., etc., cd. on at Hull as "J. W. Locking." Nom. Cap.: £5,000 in £1 shares.

BROUGH AND WILD'S DAIRIES, LIMITED. (236289) Regd. January 10, 1929. To take over the bus. of dairyman cd. on at 1, Hiram St., Bradford Rd., Manchester, by G. Brough and B. Wild. Nom. Cap.: £8,000 in £1 shares.

JOHN S. DERBYSHIRE AND SON, LIMITED. (236295) Regd. January 10, 1929. To carry on the bus. of wholesale and retail grocers and provn. mchts. mnfg. and retail confectioners, etc. Nom. Cap.: £30,000 in £1 shares.

WATERALL AND EBERLIN, LIMITED. (236305) Regd. January 10, 1929. To take over the bus. cd. on at 2, Chapel Bar, Nottingham, as "Waterall and Eberlin," and to carry on the bus. of chemists and druggists, etc. Nom. Cap.: £3,000 in £1 shares.

SEA PRODUCTS, LIMITED. (236308) Regd. January 10, 1929. To engage in the fishing and whaling industry in all parts of the world, etc. Nom. Cap.: £80,000.

CREAMY WHIP FREEZE, LIMITED. (236321) Regd. January 11, 1929. Astor House, Aldwych, W.C.2. To carry on the bus. of mnfrs. of and dlrs. in ice and ice-cream; bakers, confectioners, etc. Nom. Cap.: £1,000 in 1/- shares.

REDDITCH PURE MILK COMPANY, LIMITED. (236330) Regd. January 11, 1929. The Dairy, Albert Street, Redditch. To take over the bus. of a dairyman cd. on at Redditch by F. H. Hyde. Nom. Cap.: £2,000 in £1 shares (1,400 ord. and 600 deferred).

GEORGE BENNETT'S STORES, LIMITED. (236353) Regd. January 12, 1929. 24-27, Rood Lane, E.C.3. To carry on the bus. of grocers, provision mchts., bakers, and confectioners, etc. Nom. Cap.: £2,000 in 5/- shares.

COLLIERS (NORWICH), LIMITED. (236380) Regd. January 14, 1929. 40, St. Stephen Street, Norwich, Norfolk. To carry on the bus. of bakers, pastrycooks, and confectioners, etc. Nom. Cap.: £1,000 in £1 shares.

C. M. C., LIMITED. (236407) Regd. January 15, 1929. To carry on the bus. of confectionery and jelly mnfrs., etc. Nom. Cap.: £1,000.

FOCKE MCKERROW AND COMPANY, LIMITED. (236410) Regd. January 15, 1929. 110, Cannon Street, E.C.4. To carry on the bus. of import, export, Eastern and Colonial mchts., brokers, factors, importers and exporters of butter, cheese, corn, flour, eggs, fruit, and farm produce, etc. Nom. Cap.: £5,000 in £1 shares.

SODAX (1929), LIMITED. (236419) Regd. January 15, 1929. 31, Lombard Street, E.C.3. To enter into an agmt. with Sodax, Ltd., and H. T. Jenner, and to carry on the bus. of mnfrs. of and dlrs. in soda water machines, etc. Nom. Cap.: £150,000 in 5/- shares. Minimum subsn.: £1 15s.

RIALTO PHARMACY, LIMITED. (236428) Regd. January 16, 1929. 23, Church Road, Upper Norwood, S.E.19. To carry on the bus. indicated by the title. Nom. Cap.: £300 in £1 shares.

W. H. ALLAN, LIMITED. (236431) Regd. January 16, 1929. 344, High Road, Willesden, N.W. To carry on the bus. of grocers, provision mchts., etc. Nom. Cap.: £500 in £1 shares.

P. J. READ, LIMITED. (236443) Regd. January 16, 1929. 17, Endell Street, W.C.2. To take over the bus. of a wholesale and retail fruit, vegetable, and potato salesman, etc., cd. on at 25, Henrietta St., W.C.2. Nom. Cap.: £1,000 in £1 shares.

G. E. STEVENS (HIGH WYCOMBE), LIMITED. (236489) Regd. January 18, 1929. 22, Church Street, High Wycombe, Bucks. To take over the bus. of a coal, corn, seed, and yeast mcht., etc., cd. on at Church St., and Priory Road., High Wycombe, by G. E. Stevens. Nom. Cap.: £15,000 in £1 shares.

DOWNS, LIMITED. (236511) Regd. January 18, 1929. To take over the bus. of confectionery agents cd. on at 50, Handyside Arcade, Leazes Lane, Newcastle-on-Tyne, by J. H. Downs. Nom. Cap.: £1,000 in £1 shares.

SIM MEDICINES, LIMITED. (236520) Regd. January 19, 1929. 207, Longley Road, Tooting, S.W.17. To carry on the bus. of mnfrs. of and dlrs. in medicines, etc. Nom. Cap.: £500 in 200 preference shares of £1 each and 6,000 ordinary shares of 1/- each.

JAMES BEBBINGTON AND COMPANY, LIMITED. (236530) Regd. January 19, 1929. To take over the bus. of a sugar boiler and genl. dlr. in and mnfr. of sweets and confectionery cd. on at St. Werburgh St., Chester, as "J. Bebbington and Co." Nom. Cap.: £1,500 in £1 shares.

MOLINARI RESTAURANT, LIMITED. (236531) Regd. January 19, 1929. 34, Old Compton Street, Soho, W.1. To enter into an agmt. for the acquisition of the bus. cd. on at Old Compton St., W., as the "Sportsman's Restaurant." Nom. Cap.: £3,000 in £1 shares.

MULLINER BROS., LIMITED. (236532) Regd. January 19, 1929. 47a, Chapel Street, Southport. To carry on the bus. of sugar boilers and mnfrs. and mchts. of sweets, etc. Nom. Cap.: £3,000 in £1 shares.

VECTOIDS, LIMITED. (236536) Regd. January 19, 1929. 42, Ranelagh Road, Pimlico, S.W.1. To mnfre., sell, and deal in medicines, etc. Nom. Cap.: £5,000 in 4,500 "A" shares of £1 each and 10,000 "B" shares of 1/- each.

SAM ISAACS (BILLINGSGATE), LIMITED. (236571) Regd. January 21, 1929. 8, Cross Lane, Eastcheap, E.C.3. To take over the bus. of wholesale fish salesmen and dlrs. in fish cd. on by Nuthalls (Caterers), Ltd., formerly known as Sam Isaacs, Ltd. Nom. Cap.: £1,000 in £1 shares.

L. R. TILLEY, LIMITED. (236584) Regd. January 22, 1929. 100, St. Clement's House, St. Clement's Lane, E.C.4. To take over the bus. of a confectionery mnfr. cd. on at The Crescent Confectionery Works, Stamford, Lincs., by L. R. Tilley. Nom. Cap.: £7,000 in £1 shares (5,000 pref. and 2,000 ord.).

OLYMPUS, LIMITED. (236586) Regd. January 22, 1929. 21, Soho Square, W.1. To carry on the bus. of refreshment room proprs., etc. Nom. Cap.: £500 in £1 shares.

JANES, ROUSE AND COMPANY, LIMITED. (236605) Regd. January 23, 1929. 23, Wendover Road, Aylesbury, Bucks. To carry on the bus. of chemists, druggists, opticians, etc. Nom. Cap.: £1,000 in £1 shares.

LAMB'S AGENCIES, LIMITED. (236608) Regd. January 23, 1929. 60, Mark Lane, E.C. To carry on the bus. of brewers, distillers, etc. Nom. Cap.: £1,000 in £1 shares.

SHAPLEY AND SONS, LIMITED. (236617) Regd. January 23, 1929. To take over the bus. of grocers and provision mchts. cd. on at 2-3, The Strand, Torquay, as "E. J. and L. S. Shapley." Nom. Cap.: £40,000 in £1 shares (20,000 pref. and 20,000 ord.).

BURHAM COURT, LIMITED. (236653) Regd. January 25, 1929. Burham Court, Burham, Kent. To carry on the bus. of farmers in all its branches. Nom. Cap.: £300 in 1/- shares.

FRED ARMITAGE AND COMPANY, LIMITED. (236658) Regd. January 25, 1929. To take over the bus. of bakers and confectioners cd. on at 110, Castle St., Stockport, as "Fred Armitage and Co." Nom. Cap.: £1,000 in £1 shares.

WILLIAM PERMAIN (WHOLESALE), LIMITED. (236705) Regd. January 26, 1929. To carry on the bus. of wholesale fruiterers, greengrocers, provn. mchts., etc. Nom. Cap.: £2,500 in £1 shares.

CHAS. LOWE AND COMPANY (MANCHESTER), LIMITED. (236708) Regd. January 26, 1929. 43, Piccadilly, Manchester. To take over the bus. of a mnfg. chemist cd. on at Reddish, and 43, Piccadilly, Manchester, as "Chas. Lowe and Co." Nom. Cap.: £40,000 in £1 shares.

F. C. CALVERT AND COMPANY, LIMITED. (236709) Regd. January 26, 1929. 43, Piccadilly, Manchester. To take over the bus. of a mnfg. chemist cd. on at Gibbon St., Bradford, and 43, Piccadilly, Manchester, as "F. C. Calvert and Co." Nom. Cap.: £100,000 in £1 shares.

JOHN ELLIS AND COMPANY, LIMITED. (236728) Regd. January 28, 1929. To take over the bus. of a grocer, warehouseman, provision dlr., etc., cd. on at Westgate (and formerly in the Bull Ring), Wakefield, Yks., as "John Ellis and Co." Nom. Cap.: £2,000 in £1 shares.

TIDSWELL, BAILEY AND TIDSWELL, LIMITED. (236739) Regd. January 28, 1929. Chef de Set Mills, Carnarvon Street, Cheetham, Manchester. To take over the bus. cd. on at Cheetham as "Tidswell, Bailey and Tidswell," and to carry on the bus. of grocers and provn. mchts., etc. Nom. Cap.: £15,000 in £1 shares (5,000 pref. and 10,000 ord.).

W. G. CLARKE AND SONS (1929), LIMITED. (236740) Regd. January 28, 1929. To take over the bus. of W. G. Clarke and Sons, Ltd., cd. on at Limehouse, E., and at Canning Place, Liverpool, and elsewhere, and to carry on the bus. of mnfrs. of and dlrs. in biscuits, bread, confectionery, and all pharmaceutical, medicinal, surgical, and other preparations and appliances, etc. Nom. Cap.: £650,000 in £1 shares (250,000 pref. and 400,000 ord.).

HOMADE BAKERY COMPANY, LIMITED. (236749) Regd. January 29, 1929. 97, Mortimer Street, W.1. To carry on the bus. indicated by the title. Nom. Cap.: £1,500 in 500 preference shares of £1 each and 4,000 at 5s.

REEDS STORES, LIMITED. (236792) Regd. January 30, 1929. To take over the bus. of a grocer, provn. mcht. corn factor and mcht., etc., cd. on at 36 and 37, Middle St., Great Driffield, by J. R. Reed. Nom. Cap.: £12,000 in £1 shares.

STANIFORM, LIMITED. (236794) Regd. January 30, 1929. Carnwath Road, Fulham. To acquire a certain patent for an invention relating to a pharmaceutical preparation known as "Staniform," and also to acquire the regd. trade mark "Staniform," and to enter into an agmt. with Whiffen and Sons, Ltd. Nom. Cap.: £5,000 in £1 shares.

KNOWLAND BROTHERS, LIMITED. (235806) Regd. December 21, 1928. 8/9, Charing Cross Chambers, Adelphi, W.C. To carry on the bus. of hotel, restaurant, and café keepers, etc. Nom. Cap.: £10,000 in £1 shares.

PETER YATES AND SONS, LIMITED. (235800) Regd. December 21, 1928. 5, Queen Street, Leigh, Lancs. To take over the bus. of a grocer and provision dlr. cd. on at Leigh, Lancs., as "Peter Yates and Sons." Nom. Cap.: £4,000 in £1 shares.

W. HOOKER AND SON, LIMITED. (235851) Regd. December 21, 1928. To carry on the bus. of flour and corn mchts. and millers, etc. Nom. Cap.: £6,000 in £1 shares.

WASTE FOOD UTILITIES (PRELIMINARY), LIMITED. (235854) Regd. December 21, 1928. 8, Bucklersbury, E.C.4. To acquire the process, methods, and formulæ of John Williams for the treatment of surplus and waste food for the conversion thereof into food for cattle, horses, etc. Nom. Cap.: £15,000 in 2/- shares. Minimum subsn.: 100 shares.

W. VALE AND COMPANY, LIMITED. (235885) Regd. December 22, 1928. 93 and 94, Winchcombe Street, Cheltenham. To carry on the bus. of grocers and Italian warehousemen cd. on at Cheltenham by W. Vale. Nom. Cap.: £4,000 in £1 shares.

Legal News

The Editor and Proprietors of FOOD MANUFACTURE *do not accept responsibility for any errors which may occur in the following Law Reports.*

Adjourned from December 20 last, so that plaintiffs' chief chemist could attend to business in America, Mr. Justice Romer, in the Chancery Division on February 5, resumed the hearing of the action by the Douglas Packing Company and the Certo Corporation of Rochester, N.Y., U.S.A., for an injunction restraining infringement by William Evans and Company (Hereford and Devon), Limited, of Widemarsh, Hereford, of their patents for the manufacture of pectous compounds used in jam and jelly-making, and for an inquiry as to damages and delivery up of all infringing materials.

Defendants denied infringement and alleged that the patent was bad on the grounds of prior publication and user and lack of novelty.

Dr. Goldsmith, consulting chemist, the defendants' chief expert witness, persisted, under cross-examination, that the plaintiffs' alleged discovery contained nothing new.

Mr. William Herbert Yates, also a consulting chemist, said, in 1902, before the date of the plaintiffs' patents, he knew of a process for making jam set better by adding other substances.

His lordship said he would consider his judgment and deliver it later.

MARGARINE UNION, LTD.

An extraordinary general meeting was held on January 30, the Rt. Hon. the Earl of Bessborough, C.M.G. (Chairman), presiding. The Chairman said that very close relationship existed between the company and the N.V Margarine Unie. The accounts to be submitted to the general meeting in May would

show profits for the two companies at the end of 1928 amounting to approximately £1,680,000, which, after the deduction of the preference dividend of £146,000, would leave a profit to be dealt with equivalent to nearly 17 per cent. on the total ordinary capital issued at the end of the year. The directors had decided to recommend that the whole of the preliminary expenses, £483,000, should be written off out of the profits of the first year, and that a dividend of 10 per cent., of which 4 per cent. had already been paid, should be distributed to the ordinary shareholders, in so far as they were entitled to the full dividend in respect of 1928. These allocations would absorb about £1,530,000, and the balance of profits then remaining would be recommended to be applied partly to be carried forward to 1929 and partly to reserve. The total issued ordinary capital of the two companies on December 31 last was approximately £9,300,000, and the preference capital £2,083,000. It was now proposed to increase the nominal capital of the Margarine Union to £4,100,000, and the nominal capital of Margarine Unie to 350,000,000 guilders, or approximately £29,000,000. The directors intend shortly to issue a part of the new capital of both companies, and ordinary shareholders will be offered one new share for every three held at the price of 150 per cent., being 30s per share. The new capital is required to finance acquisitions made and being made, and to provide funds to meet a quickly expanding trade. The resolution was carried unanimously. A meeting of N.V. Margarine Unie was held on the same day in Rotterdam, when the necessary resolution was passed for increasing its capital to 350,000,000 guilders.

London Gazette Information

Joint Stock Companies.

At the expiration of three months, the names of the undermentioned companies will, unless cause is shown to the contrary, be struck off the Register, and the companies will be dissolved:

Liverpool Syrup Co., Ltd.
London Fruit Market, Ltd.

Voluntary Liquidation.

EASTERN EDIBLES, LTD. Resolved, February 8, 1929, that the company cannot, by reason of its liabilities, continue its business, that it be wound up voluntarily, and that Mr. R. G. Acock, I.A., 36, Regent Street, Gt. Yarmouth, be appointed liquidator.

Bankruptcy Acts—Release of Trustee.

BURFORD, ERNEST ENOCH, trading as E. BURFORD (JUNIOR), carrying on business at Alscot Works, Kintore St., Bermondsey, S.E. Vinegar Merchant. (108 of 1927) Trustee: Mr. A. H. Partridge, C.A., 3, Warwick Court, Gray's Inn, W.C.1. Release: December 18, 1928.

(*Continued from next page.*)

150. Vitamin A Content of Liver. (*Deut. Med. Wochensch.*, 1928, 1945.)

151. Some Factors Affecting Consistency in Canned Corn. Geidel. (*Canner*, 1929, 68, 5, 17-19.)

152. Cooling Methods, Applicable to Large Diameter Cans following Pressure Processes. Vaughan. (*Ibid.*, 20-22.)

153. Mass Production as it Works in Soup Canning Industry. Budd. (*Ibid.*, 27-28.)

154. Glass Containers stand Processing at High Temperatures. Ayers and Ford. (*Ibid.*, 51-52.)

155. Factors which Cause Separation of Mayonnaise during Storage and Transportation. Gray and Southwick. (*Glass Packer*, 1929, January, 17-41.)

156. White Syrups from Raw Sugars. Jordan. (*Mfg. Confectioner*, 1929, January, 48-50.)

157. Report of Food Investigation Board for 1927. (H.M.S.O., 4s. 2d. post free. 8 ozs.)

158. Development of Agriculture Commission's 18th Report. Year ending March 31st, 1928. (H.M.S.O., 3s. 9d. post free. 12 ozs.)

159. Dried Milk in Bread. Hornibrook. (*New Health*, 1929, February, 23-26.)

160. Accounting Problems in Canning Business. Rowntree. (*Canner*, 1929, 68, 6, 17-21.)

161. Soil Fertility. Stewart. (*Canning Age*, 1929, February, 125-127.)

162. Manures and Fertilisers. Shutt and Wright. (Canadian Dept. of Agric., Bull. No. 92; Ottawa, Acland.)

163. Provision Judging by Colour. Nicholls. (*Grocery*, 1929, January, 36.)

164. The Clove. Redgrove. (*Ibid.*, 55.)

165. Prepared and Cooked Meats. Beeching. (*Ibid.*, 58.)

Analysis

166. International Standard for Mineral Water Analysis. (*Anal.*, 1929, 634, 33.)

167. Determination of Reducing Sugars, especially Dextrose, in Presence of Hydrocyanic Acid by means of Alkaline Copper Solutions. Hérissey and Chalmeta. (*J. Pharm. Chim.*, 1928, 8, 393-406.)

168. Iodine Value of Spanish Paprika Oil. Mitchell and Alfend. (*J. Assoc. Off. Agric. Chem.*, 1928, 11, 523-527.)

169. Determination of Camphor in Pharmaceutical Preparations. Bougault and Leroy. (*Ann. Falsific.*, 1928, 21, 456-460.)

170. Note on Quantitative Methods of Measurement of the Nutritive Value of Proteins. Mitchell. (*Biochem. J.*, 1928, 22, 261.)

171. Toxicological Study of Bismuth. Fabre and Picon. (*J. Pharm. Chim.*, 1928, 120, 297-308.)

172. Detection of Arsenic. Dauvé. (*Ann. Chim. Analyt.*, 1928, 10, 320-321.)

173. The Protamines and Histones. Kossell. (Longmans. 9s.)

174. Theory and Technique of Quantitative Analysis. Farnsworth. (Chapman and Hall, 154. 12s. 6d.)

175. Volumetric Analysis. Berry. (Camb. Univ. Pr., p. 152. 6s.)

176. New German Method of Vinegar Analysis. Wustenfeld and Kreipe. (*Fruit Prod. Jour.*, 1929, 8, 5, 27-30.)

177. Acidimetric Method of Determining Dextrose using Fehling's Solution. Hadjieff. (*Z. Unters. Lebensm.*, 1928, 55, 615-618.)

178. Estimation of Alcohol. Pt. I. Whaley. (*Planter and Sug. Man.*, 1929, 82, 4, 61-65.)

Current Literature

Fruit and Vegetable Products

99. The Natural Occurrence of Boron Compounds in Fruit and Vegetable Products. Scott Dodd. (*Anal.*, 1929, 634, 15-19.)

99*a*. Boric Acid in Oranges. (*Ibid.*, 28.)

100. Respiration in Fruits and Vegetables. E. F. Kohman. (*Canner*, 1929, 68, 4, 13-15.)

101. Hydrogen Swelling of Canned Ready-to-Serve Prunes. Mrak and Richert. (*Fruit Prod. J.*, 1929, 8, 5, 11-15.)

102. The Effect of Blanching on the Hydrogen Swelling of Ready-to-Serve Prunes. (*Ibid.*, 13-14.)

103. Sugars used in the Fruit Products Industries. Cruess. (*Ibid.*, 16-19.)

104. Two New Methods for Determining the Oil Content of Olives. Pt. I. Kaloyereas, Cruess and Lesly. (*Ibid.*, 20-22.)

105. Malt Vinegar and its Manufacture. Pt. II. Hassack. (*Ibid.*, 24-26.)

106. Celery. (*Braunschw. Konserven. Z.*, 1929, 5, 5-6.)

107. Composition chimique des Fruits du potiron (*Cucurbita maxima*). Rivière and Pichard. (*J. Soc. Nat. d'Hortic. de France*, 1927, 4, 28, 2-4.)

108. Grapefruit Culture in the British West Indies and British Honduras. (H.M.S.O., 1s. 2d. post free. 8 ozs.)

109. Viticultural Research. (H.M.S.O., 1s. 2d. post free. 8 ozs.)

110. Report on Insect Infestation of Dried Fruit. (H.M.S.O., 1s. 2d. post free. 8 ozs.)

Cereal Products

111. New Carbohydrates in Rye Flour and Detection of Rye Flour in Wheat and other Flours. Tillmans. (*Z. Unters. Lebensm.*, 1928, 56, 26-32.)

112. The Vitamin A Content of Wheat Oil. Sure. (*Jour. Ag. Res.*, 1928, 37, 93-99.)

113. Phosphorus Distribution in Grains. Webster. (*Ibid.*, 123-125.)

114. The Influence of the Soil Reaction on the Ionisable Constituents of the Tomato as Determined by Electrodialysis. (*Ibid.*, 101-104.)

115. Forecasting Wheat Yields from the Weather. (*Food Research Institute*. Stanford Univ., California.)

116. Economic Possibilities of Rice Grass. (*Jour. Minist. Agric.*, 1929, January.)

117. Cereal Crops of Essex, 1926-1927. (*Ibid.*)

118. The Agricultural Output of Scotland. (*Scottish Jour. Agric.*, 1928, October. H.M.S.O., quarterly, 1s. 2d. post free.)

119. Wintering of Bees. (*Ibid.*)

120. The Biologist on the Farm, No. xxxi. (*Ibid.*)

Various

121. Irradiation of Ergosterol. Webster and Bourdillon. (*Biochem. J.*, 1928, 22, 1223-1230.)

122. Auterachitic Substances. VIII. Studies on Highly Purified Ergosterol and its Esters. Bills and Honeywell. (*J. Biol. Chem.*, 1928, 80, 15-23.)

123. Vitamin A Content of the Unsaponifiable Matter of Cod Liver Oils. Meno, Yamashita, and Ota. (*J. Soc. Chem. Ind.* Japan, 1928, 31, 281 B.)

124. Crab Liver Oil. Tsujimoto. (*Ibid.*, 279 B.)

125. Synthesis of Vitamin B in the Rumen of the Cow. Bechdel, Honeywell, Dutcher, and Knutsen. (*J. Biol. Chem.*, 1928, 80, 231-238.)

126. The Constitution of Sugars. W. N. Howarth, F.R.S. (E. Arnold and Co. 8s. 6d.)

127. Psychological Tests in an Electric Lamp Works. Prak. (*Jour. Nat. Inst. Indust. Psych.*, 259-260.)

128. The Human Factor in Industry. Cathcart. (Oxford: The Univ. Press, pp. iv. and 105. 5s.)

129. Chemico-Technical Calculation of Beet Sugar Manufacture. Kucharenko. (*Planter and Sug. Man.*, 1928, 26, 505.)

130. Outlook for Canned Food (American) Exports in 1929. (*Canner*, 68, 2, 34.)

131. Milling Problems and Efficient Grinding Capacity of a Sugar Cane Mill. Scharnberg. (*Planter and Sug. Man.*, 1929, 1.)

132. Method of Manufacturing Orange Wine and Lemon Wine. Conner. (*Min. Wat. Tr. J.*, 1929, 492, 13-14.)

133. Columbia University Refrigerator Tests. (*Ice and Refrig.*, 1929, January, 15.)

134. Getting the most out of Ice Trucks. N. Sorensen. (*Ibid.*, 16.)

135. Annual Review of Cold Storage Industry in North America. (*Ibid.*, 19.)

136. Handling, Packing, and Shipping of Freezer Meats. (*Ibid.*, 25-26.)

137. Canned Sardine Trade of the World. Scully. (*Canner*, 1929, 68, 4, 31-32.)

138. Use of Candy as part of Reducing Diet. Bundeson. (*Confect. J.*, 1929, January, 61-62.)

139. Problems in Candy Making. (*Ibid.*, 73-74.)

140. The Common Salt Industry. Smith. (*Chem. Age*, 20, 500, 77.)

141. The Nobility of Tin. Kohman and Sanborn. (*Canning Age*, 1929, January, 39-42.)

142. Basidiomycoetes. (*Ibid.*, 51-53.)

143. Warehousing and its Place in Economic Distribution. Gilbert. (*Wholes. Groc.*, 1928, December, 7-8.)

144. Chemico-Techincal Calculation of Beet Sugar Manufacture. Pt. III. Kucharenko. (*Planter and Sug. Man.*, 82, 2, 23-25.)

145. Artificially Induced Mutations. Foster. (*Ibid.*, 21-23.)

146. Absorption Spectra and Fluorescence of Fats. Sproesser. (*Chem. Umschau.*, 1928, 35, 325-327.)

147. Alkali Soil Studies and Methods of Reclamation. Burgess. (*Ariz. Agric. Exp. Sta. Bull.*, 1928, 123, 157-181.)

148. Effect of Hot Molasses on Exhausted Beet Slices. Kohn. (*Z. Zuckerind. Czechoslov.*, 1928, 53, 157-161.)

149. Vitamine und Konserven Industrie. (*Ibid.*, 6.)

(*Continued on previous page.*)

Recent Patents

These particulars of New Patents of interest to readers have been selected from the "Official Journal of Patents," and are published by permission of the Controller of H.M. Stationery Office.

Latest Patent Applications

3686. CLARK, G. M. (MATRO GES.): Production of extracts containing vitamins. February 4.

3886. EPSTEIN, A. K.: Manufacture of margarine, etc. February 5.

3954. AUCKLAND, J. W.: Means for marking eggs. February 6.

4363. DENNIS, C. B.: Stamps for eggs. February 9.

4446. HELHOLT, K.: Manufacture of vitaminous products. February 9.

Specifications Published

291,770. JACOBSEN, K. A.: Manufacture of yeast.

296,985. CLASSEN, DR. H.: Recovering sugar from the exhausted sludges or scums of sugar manufacture.

304,341 KILNER, A. H.: Method of preserving foods.

304,389. SUTAX, LTD., AND SUTCLIFFE, J. W.: Sterilisation and like treatment of food and like products.

304,868. LANGVA, H. K. T.: Treatment of split-fish.

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at the uniform price of 1s. each.

Abstracts Published

299,336. **Yeast.** OLSEN, A. J. C., 11, Alexander Road, Epsom, Surrey, and INTERNATIONAL YEAST CO., LTD., 2, Pall Mall East, London.

In a continuous-addition continuous-withdrawal process for manufacturing yeast by fermentation in three or more separate quantities in successive stages of yeast growth, the yeast environment is controlled in the first two or more of the said quantities, including continuous additions of yeast nutrient, in such a manner as to maintain constancy of quality of the final yeast. Three or more separate fermenters are used in series communication, and additional fermenters may be employed to replace any fermenter by short-circuiting for cleaning, etc. The seed yeast added to the fermenters may be of the same or of different generation. The concentration of yeast may be maintained the same in each fermenter, and yeast or yeast-containing wort may be introduced into any fermenter from any preceding or succeeding fermenter. Specifications 252,193 and 259,572 are referred to.

299,340. **Moulding chocolate shells, etc.** HEAD, R., 82, Ashburnham Road, Luton, Bedfordshire, ANCIENS ÉTABLISSEMENTS A. SAVY, JEANJEAN, ET CIE SOC. ANON., Avenue Dubonnet, Courbevoie, Seine, France, and BAKER PERKINS, LTD., Willesden Works, Hythe Road, Willesden, London.

299,617. **Milk preparations.** BÜNING, H., 30, Kapellenstrasse, Wiesbaden, Germany.

For producing artificially enriched milk and artificial creams earth nut oil hardened to 32° C. is added to the milk, the mixture or the oil being homogenised under a pressure of 175 atmospheres for enriched milk, 150 atmospheres for coffee cream, and 50 to 75 atmospheres for whipped cream. The homogenisation of the mixture is effected in a homogenising-machine and that of the oil alone by injecting it into the milk under the specified pressure preferably through a nozzle having an orifice of 0·5 mm. diameter. In producing the cream capable of being whipped, after the homogenisation stage the mass is put through a centrifugal machine and the artificial cream thus separated is then pasteurised; or 35 parts of fat may be injected into 65 parts of milk at a pressure of 50 to 75 atmospheres. In making the artificial coffee cream pasteurised milk is used. Sesame oil may be mixed with the earth nut oil and the mixture hardened to a temperature of 32° C. Specifications 2020/05, 125,172, 128,544, and 195,343 are referred to.

299,803. **Cereal foods.** JERSEY CEREAL CO., Cereal, Pennsylvania, U.S.A.—(Assignees of Luke, C. E., Irwin, Pennsylvania, U.S.A.) (Not yet accepted.

Products obtained in special forms; treatment by flattening and heating.—Grain kernels, such as those of rice, are prepared by cooking with seasoning and colouring material such as salt, syrup, and the like. The cooked grains are then passed through rolls that flatten them into wafer shapes having appreciable thickness. The flattened grains are placed in an oven at 400° to 450° F. and at atmospheric pressure and toasted. Wheat, corn, and barley may be treated similarly to rice.

299,819. **Medicines.** WRIGHT, C. A., 78, Bendemeer Road, Putney, London.

299,839. **Packing tea, etc.** MOORE, G. E., Panitola P.O., Upper Assam, British India. (Not yet accepted.)

299,840. **Can-making machines.** AMERICAN CAN CO., 120, Broadway, New York, U.S.A.—(Assignees of Cabot, W. K., 69, Watchung Avenue, Montclair, New Jersey, U.S.A.). (Not yet accepted.)

299,844. **Saccharifying cellulose.** INTERNATIONAL SUGAR AND ALCOHOL CO., LTD., 2, Pall Mall East, London. (Not yet accepted.)

Glucose.—In a diffusion process for saccharifying cellulose-containing material with hydrochloric acid the material is pre-mashed in a mixer with a part of the total acid used and then transferred to the diffuser. The proportion of acid used in the mixer is such that the heat developed in the subsequent treatment in the diffuser produces a temperature of 25° to 30° C. The liquid used for pre-mashing is preferably an acid solution of partially hydrolised cellulose from a previous diffusion.

299,881. **Milk-machines; valve gear; dashpots.** AKTIEBOLAGET SEPARATOR, 8, Fleminggatan, Stockholm. (Not yet accepted.)

299,887. **Packeting-machines.** I. G. FARBENINDUSTRIE AKT.-GES., Frankfort-on-Main, Germany. (Not yet accepted.)

299,920. **Delivering measured quantities of liquid.** MULLER, J., 98, Avenue de Lutece a La Garonne, Colombes, Seine, France.

299,952. **Dinner waggons.** KIRKBY AND SONS, LTD., C., AND KIRKBY, H. W., 123, Arundel Street, Sheffield.

300,020. **Fastenings, etc., for boxes, etc.** HILL, W. J., 4, St. Paul's Square, Birmingham.

300,026. **Fishing.** DANBY, F. S., 10, Beaks Hill Road, King's Norton, Birmingham.

300,063. **Covers for jars, etc.** JOHNSON AND JORGENSEN FLINT GLASS, LTD., AND ELLETT, W. A., 26, Farringdon Street, London.

300,074. **Delivering measured quantities.** BREW, A., 69, Victoria Road, Barking, London.

300,113. **Cheese; food preparations.** PHENIX CHEESE CORPORATION, 345, Greenwich Street, New York, U.S.A.—(Assignees of Martin E. S., 41, South Munn Avenue, East Orange, New Jersey, U.S.A.)

Cheese or a cheese mass formed by adding milk, cream, or butter to comminuted cheese is stirred and heated to about 165° F. to effect pasteurisation and is then homogenised by passage through small openings under pressure of the order of 300 lbs. per sq. in. While still hot the mass is run or poured into containers and hermetically sealed, after which the containers with their contents may be further heated to improve the keeping qualities of the cheese; or the hot cheese mass may be run or poured into cartons or boxes. An emulsifier, such as sodium citrate, may be added to the mass. U.S.A. Specifications 1,389,095 and 1,389,577 and reissue 15648/22 are referred to.

300,128. **Depilating skins.** STEINERT, W., 13, Am Hauptbahnhof, Chemnitz, Germany.

300,135. **Drying coffee, etc.** PENTEADO AND CO., B., Limeira, S. Paulo, Brazil.—(Assignees of Mareira, N. G., Sete Lagoas, Minas Geraes, Brazil.)

300,147. **Cooking-sieves.** BAKER, LTD., G., AND BAKER, F., Cecil Steel Wire Works, Cecil Street, Birmingham.

300,194. **Puffed cereal, etc., products.** ANDERSON PUFFED RICE CO., 80, East Jackson Boulevard, Chicago, U.S.A.—(Assignees of Anderson A. P., Red Wing, Minnesota, U.S.A.)

300,202. **Packing cheese; wrappers.** KUSTNER FRÈRES ET CIE SOC. ANON., 10, Boulevard James Fazy, Geneva, Switzerland.

300,229. **Testing purity of liquids.** RANGER, H. L., 9, Stoke Road, Guildford, Surrey.

300,261. **Puffed food preparations.** KELLOGG CO., Battle Creek, Michigan, U.S.A.—(Assignees of McKay, E. H., 188, Hubbard Street, Battle Creek, Michigan, U.S.A.)

300,266. **Separating mixtures of liquids.** MERCK, W., MERCK, K., MERCK, L., MERCK, W., AND MERCK, F. (trading as MERCK, E. [Firm of]), Darmstadt, Germany.

300,291. **Flour, etc.** FISHER, E. A.; AND JONES, C. R., of Research Association of British Flour Millers, Old London Road, St. Albans, Hertfordshire.

Treating with air; treatment by damping.—Flour is subjected to treatment for a period not exceeding three hours by a current of air at such temperature and humidity as will raise the temperature of the flour to, and maintain it within, the approximate limits of 130° to 180° F. without reducing the moisture content of the flour to less than about 10 per cent. The period of treatment depends upon the temperature reached by and the original moisture content of the flour and the humidity of the air. The air may be passed over heaters and sprays to raise it to the temperature and humidity appropriate to give and to maintain the desired temperature and moisture content of the flour, and over automatic controls operating on the heaters and sprays so that the air entering the flour chamber may be maintained automatically at the desired temperature and humidity. The air may be circulated over thin layers of flour on trays and then recirculated through the heaters and sprays. In this case it is not desirable to reduce the relative humidity of the air below about 60 per cent. Maximum improvement is obtained by 1 to 2 hours' treatment at 140° F. Ten to twenty minutes' treatment is sufficient at 160° F. The flour may be cooled by circulating cold air through the plant. Moisture may be added, if necessary, by spraying the flour with finely atomised water. The treatment can be applied to finished flour, to intermediate milling products such as semolina, middling, and dunst, and to any or all of the various "divides." Specification 300,537 is referred to.

300,329. **Manures.** JOHNSON, J. Y., 47, Lincoln's Inn Fields, London.—(I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany.)

Mixed fertilisers are obtained by mixing urea with aluminium phosphate or iron phosphate or with mixtures of these phosphates. Mixed aluminium and iron phosphate obtained on neutralising with ammonia,

for the recovery of ammonium phosphate, the phosphoric acid formed by dissolving raw phosphates, may be used. Potassium or other fertilising salts may be added.

300,655. **Drying milk, etc.** PFEFFERKORN, K. W., 27, New York, U.S.A.

Film evaporators.—In apparatus for drying milk, etc., of the kind in which the liquids to be dried are treated with hot air while travelling in a thin film on an endless conveyer belt, the upright portions of the belt divide a vapourising chamber containing the preheated fresh air from a heat distributing chamber. The apparatus comprises an upright casing having walls bounded by lateral plates. Fresh air is pumped through a filter and pipe.

300,332. **Weighing-apparatus.** AVERY, LTD., W. AND T. AND SYKES, C. M., Soho Foundry, Birmingham.

300,335. **Making sandwich biscuits.** VICARS, LTD., T. AND T., Earlstown, and CROSLAND, E. M., Kirkby, High Street, both in Newton-le-Willows, Lancashire.

300,515. **Flour improvers.** NAAMLOOZE VENNOOTSCHAP NOURY AND VAN DER LANDE'S HANDELMAATSCHAPPIJ AND LANDE, J. A. L. VAN DER, Deventer, Holland.

Treatment by heating; heating with air and gases.—A wheaten cereal is heated without substantially increasing the moisture content and under atmospheric pressure in a practically motionless atmosphere at a temperature lying between 70° and 90° C. for such a length of time that from 5 to 70 per cent. of the gluten content of the flour becomes non-retainable in a washing test. The resulting product is mixed with ordinary flour in the proportion of ·5 to 2 per cent. Oxygen may be excluded during the treatment, but indifferent gases such as carbon-dioxide or vapours may be present. The process is applicable to wheat as well as its intermediate and final milling products.

300,520. **Liquid-meters.** GABBOTT, E. P., 45, Claude Road, Chorlton-cum-Hardy, Manchester, and WALKER AND HOMFRAYS, LTD., Woodside Brewery, Eccles New Road, Salford, Lancashire.

300,529. **Preserving food, etc.; fumigating.** KOBIOLKE, A. M., Gilderoy, Victoria, Australia.

300,537. **Flour, etc.** FISHER, E. A., AND JONES, C. R., Research Association of British Flour Millers, Old London Road, St. Albans, Hertfordshire.

300,545. **Indicating liquid levels.** KING-SEELEY CORPORATION, Ann Arbor, Michigan, U.S.A.—(Assignees of Bandemer, W. E., 1329, White Street, Ann Arbor, Michigan, U.S.A.)

300,568. **Treating flour, etc.** NAAMLOOZE VENNOOTSCHAP NOURY AND VAN DER LANDE'S HANDELMAATSCHAPPIJ AND LANDE, J. A. L. VAN DER, Deventer, Holland.

Treatment by heating; treating with gases; treatment by damping.—A flour improver is formed by subjecting a wheaten cereal in the wheat, intermediary, or final milled stages to the action of heat in the presence of a small quantity of an acid or a mixture of acids at a temperature lying between 35° and 90° C. so as to subject the gluten to a partial coagulation, from 95 to 30 per cent. of it remaining retainable in a washing test. In a specific example ·005 to ·05 kilograms of hydrochloric acid are used to 100 kilograms of flour. The treatment is preferably conducted in closed vessels and in such a way that oxygen is excluded from the cereal and so that water vapour cannot escape in a substantial degree. The flour may be treated with the acid before the heating. Lactic, acetic, or phosphoric acid may be used in place of hydrochloric acid. The treated flour is mixed with untreated flour in a quantity from ·5 to 2 per cent.

300,589. **Refrigerating.** ELECTRO-LUX, LTD., 153, Regent Street, London.—(Assignees of Lenning, A., 40, Flatbush Avenue Extension, Brooklyn, Gallerstrasse, Rorschach, Switzerland.

300,657. **Baking and roasting appliances.** POLLI, E. HAGER-, 37, Rütlistrasse, Oerlikon, near Zurich, Switzerland.

300,693. **Liquid containers.** GRANT, W. S., 904, South 14th Street, St. Louis, Missouri, U.S.A.

301,152. **Filtering liquids.** COX, A., Harlech, Warwick Road, Olton, Warwickshire.

301,286. **Chocolate moulds.** REICHE, K. A. M., 28, Huebner Strasse, Dresden, Germany.

Recent Trade Marks

This list of Trade Marks of interest to readers has been selected from the "Official Trade Marks Journal," and is published by permission of the Controller of H.M. Stationery Office.

PRAIRIE

498,537. **Edible fats.** THE BRITISH CREAMERIES, LIMITED, Stoneferry Road, Wilmington, Hull, and 29, Great St. Helens, London, E.C.3. February 13.

INVADER

498,538. **Cocoa, chocolate, and confectionery.** CHARLES BOND, LIMITED, Caryle Road, Bristol. February 13.

VANILAMINE

498,208. **Flavouring essences (not alcoholic) for foods and beverages.** THE LONDON ESSENCE COMPANY, LIMITED, Lofresco Works, 53, Glengall Road, Peckham, London, S.E.15. February 13.

BUGLE BRAND

498,140. **Sauces and Pickles.** ROBERT HEBRON, trading as THE PARAGON SAUCE COMPANY, 72, Hall Lane, Liverpool, Lancashire. February 13.